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# THE ANNALS

AND

# MAGAZINE OF NATURAL HISTORY.

...per litora spargite muscum,
Naiades, et circum vitreos considite fontes:
Pollice virgineo teneros hic carpite flores:
Floribus et pictum, divæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas;
Ite, recurvato variata corallia trunco
Vellite muscosis e rupibus, et mihi conchas
Ferte, Deæ pelagi, et pingui conchylia succo.
*Parthenii* Ecl.

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## the Specific and Generic Characters of the Araneiform Crustacea. By HARRY D. S. GOODSIR, M.W.S.

[With a Plate.]

AFTER a careful examination, the parts of the *Pycnogonidæ* which are found to afford the most decisive characters for the proper classification of the species are—the ocular tubercle, the palpi, oviferous legs, and tarsi. The first of these organs affords very valuable and sure characters, especially in the determination of the genera, but unfortunately has never been properly studied. It is therefore the object of the present communication to illustrate the characters of this organ. These animals, when examined by the naturalist, are generally lying in such a way as to hide this organ altogether. To see it properly the animal must be viewed in profile.

In *Pycnogonum* and all the other nonpalpate genera, we find the ocular tubercle standing at right angles with the segment of the thorax from which it arises, and with one exception (*Phoxichilidium*), in a line between the first pair of legs. In *Phoxichilus* the tubercle is pointed, but in all the others it is truncated.

### *Pycnogonum Balænarum.*

This *Pycnogonum* when viewed in profile presents the appearance shown in Pl. I. fig. 1. The rostrum is flask-shaped, and the anterior extremity slightly bulging and rounded. The ocular tubercle is situated about the middle of the first thoracic segment and is squared or truncated, bearing four small dots or eyes of a jet-black colour, which are situated in the form of a square round its superior edge

*Phoxichilus*

*Phoxichilus* has the ocular tubercle situated a little before the middle of the first thoracic segment, it is of considerable size, erect, and pointed at its extremity The eyes are four in number, and are placed rather above the middle of the tubercle The rostrum is clavate with a slight bulge before the middle, a fine line runs along its centre on each side from its base to the tip, which is crossed at right angles by another near the extremity (Pl I fig 3)

The last joint of the tarsus is bent and serrate on its inferior edge (fig 5)

The ovigerous legs of *Phoxichilus* are seven-jointed, the first, third, fourth and sixth are almost all of equal length, the second and fifth are equal (fig 4)

*Phoxichilidium coccineum*

The ocular tubercle of *Phoxichilidium* is situated on a projection which extends forwards from the first thoracic segment above the rostrum, and which likewise supports the mandibles The ocular tubercle is conical, truncated, with four eyes surrounding it at regular intervals, and which are situated at a little distance from the top The rostrum is large and clavate, and with the crucial lines as in *Phoxichilus* (Pl I fig 6)

The last joint of the tarsus is semilunar, with four spines arising from its basal and inferior edge (fig 8) The oviferous legs are five-jointed, the first two and last being almost all of equal length, and the third as long as any of the other two conjoined (Pl I fig 7)

In *Pallene circularis** the ocular tubercle is situated at the posterior edge of the first thoracic segment, and is very slightly raised above the surface of the segment The eyes are situated round its superior edges (Pl I fig 9)

The last tarsal joint is slightly curved, but the edges are parallel, the claw is blunted (fig 10)

*Pasithoe vesiculosa*†

By *Pasithoe* we are gradually led from the nonpalpate to the palpate genera of the order, and at the same time we find these organs in a maximum state of development In *Pasithoe* the ocular

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* Jameson's Edinb Phil Journ vol xxxii p 137 pl 3 fig 2

† *Ib* vol xxxiii p 370 pl 6 fig 17

tubercle arises from the centre of the first thoracic segment and projects forward, inclining very considerably over the rostrum, its extremity is blunted, and the eyes, which are four in number, are placed near the apex A thin narrow projection arises from the anterior edge of the first segment immediately before the tubercle, and is continued beyond the middle of the rostrum The palpi are eight-jointed (Pl I fig 10)

## *Nymphon Johnstoni**

The ocular tubercle in *Nymphon* arises in all the species from the posterior edge of the segment In this species it is bent from the middle backwards, at which point the eyes are situated, the apex is pointed The palpi are four-jointed (fig 14) The oviferous legs are eleven-jointed, including the claw (Pl I fig 15) The two tarsal joints are of equal length (fig 16)

## *Nymphon spinosum*†

In this species the ocular tubercle projects backwards from the base, the superior extremity is rounded, and the eyes are arranged round a projecting edge (Pl I fig 17)

The first joint of the tarsus is about half the length of the second (Pl I, fig 18)

## *Nymphon pellucidum*‡

The ocular tubercle in this species is rather short, its extremity is obtuse and rounded, and the eyes are situated a little distance from the top (fig 19)

## *Nymphon similis* (n s mihi)

The ocular tubercle is depressed and projects backwards (Pl I fig 21) It will be observed that this organ, in all the species of the genus *Nymphon*, is situated at the posterior extremity of the first thoracic segment, and also that it never projects forwards

## EXPLANATION OF PLATE I

*Fig* 1 Profile of the rostrum and first thoracic segment of *Pycnogonum Balænarum*
*Fig* 2 Abdominal surface of same parts with the oviferous leg of one side
*Fig* 3 Profile of *Phoxichilus*
*Fig* 4 Under or abdominal surface of same parts in *Phoxichilus*
*Fig* 5 Tarsus of *Phoxichilus* with portion of last tibial joint
*Fig* 6 Profile of *Phoxichilidium coccineum*
*Fig* 7 Abdominal surface of same parts with the oviferous leg of one side

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* Jameson's Edinb Phil Journ vol xxxii p 138 pl 3 fig 5 Through some error, the proper references to the plate in the journal quoted have been misplaced

† Jameson's Edinb Phil Journ vol xxxii p 139 pl 3 fig 3

‡ *Ib* vol xxxii p 138 pl 3 fig 6

*Fig* 8 Tarsus of *Phoxichilidium coccineum*
*Fig* 9 Profile of *Pallene circularis*
*Fig* 10 Tarsus
*Fig* 11 Profile of *Pasithoe vesiculosa*
*Fig* 12 Tarsal and tibial joints of *Pasithoe*
*Fig* 13 Abdominal surface of rostium and first thoracic segment of *Pasithoe*
*Fig* 14 Profile of *Nymphon Johnstoni*
*Fig* 15 Abdominal surface of rostium and first thoracic segment of *Nymphon Johnstoni*
*Fig* 16 Tarsal joints and part of last tibial joint
*Fig* 17 Profile of *Nymphon spinosum*
*Fig* 18 Tarsal joints with portion of last tibial of *Nymphon spinosum*
*Fig* 19 Profile of *Nymphon pellucidum*
*Fig* 20 Abdominal surface of first thoracic segment with oviferous leg of one side
*Fig* 21 Profile of *Nymphon similis*
*Fig* 22 Abdominal surface with oviferous leg of one side
*Fig* 23 Tarsal joints with small portion of tibial joint
*Fig* 24 Abdominal surface of first thoracic segment with oviferous leg of one side in *Nymphon minutum*
*Fig* 25 Tarsal joints of *Nymphon minutum* with small portion of last tibial joint

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## II —*On some British species of the genus* Œnanthe By JOHN BALL, B A, M R I A &c *

THE paper by Mr Coleman (Annals, xiii p 188) has induced me to endeavour to throw light upon some of the doubtful species of *Œnanthe* The *Œ fluviatilis*, Colem , I gathered six years since near Cambridge, and also near Ely, but never having found a flowering specimen was at a loss how to denominate it It certainly has much the appearance of a distinct species, but I do not think the characters assigned very satisfactory I find the fruit of the ordinary *Œ Phellandrium* to vary from elliptical to ovate, assuming quite the form figured in Mr Coleman's plate, the upper leaf in the figure is also seen in *Œ Phellandrium*

I proceed to describe what I believe to be the true *Œ pimpinelloides* of Linnæus and the continental botanists This appears to be rare in Britain, as I have only seen specimens, wanting fruit, gathered in a dry meadow upon red marl near Forthampton, Gloucestershire, by Mr Edwin Lees I give the description in Latin

*Œnan pimpinelloides* —Radix e fibris plurimis lignosis fasciculatis inferne in napulos parvulos, ovoideos incrassatis Caulis teres, striatus sulcatus, farctus sesqui-tripedalis, alternè ramosus Folia radicalia bipinnata pinnulis inciso-dentatis trifidisve, omnibus acutis, petiolo sesqui bipollicari basi in vaginam expanso, caulina infra pedunculum imum conformia pinnulis angustioribus, se-

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* Read before the Botanical Society of Edinburgh, 11th April 1844

quentia pedunculos elongatos rigidos amplectentia vagina petiolari successive breviori, pinnata pinnulis linearibus tripartitis simplicibusve, inferioribus valde elongatis, suprema caulis et pedunculorum linearia elongata *Pinnulæ foliorum omnium margine cartilagineo minute denticulato in mucronem producto* Umbellæ solitariæ terminales 6—15-radiatæ convexæ, accessoriæ primarium æquantes aut superantes. Involucrum universale nunc nullum, nunc 1—6-phyllum, foliis setaceis, inæqualibus, umbella multo brevioribus Umbellulæ multifloræ, densæ, floribus externis sæpe sterilibus longius pedicellatis, internis subsessilibus Involucella polyphylla, foliolis lineari lanceolatis, acuminatis, inæqualibus, pedicellos florigeros exteriores subæquantibus Petala inæqualia præsertim florarum sterilium, lata, obcordata, ad medium fissa, alba nervis coloratis segmenta marginis calycini liberi lato-lanceolata, inæqualia, duo exteriora longiora Diachenium

An *Œnanthe* gathered in the island of Ischia, which seems to be the *Œ pimpinelloides* of Bertoloni (Fl Ital iii 236), differs in having the pinnules of all the stem-leaves linear, the sheaths longer, and sometimes wants the sterile external florets The diachenium is of nearly equal thickness throughout, crowned with the erect persistent calyx, and somewhat longer than the stiff, slightly diverging styles, the very short adpressed pedicels forming a callous ring at the base I have this form also from near Pisa

What principally distinguishes this plant is the mucronate pinnules of all the leaves, besides which it differs from *Œ Lachenalii* in the fruit and the involucella, and from *Œ silaifolia* and *Œ peucedanifolia* in many obvious points *Œ Jordani*, Ten, which I have gathered near Pæstum, differs mainly by the very crowded umbel, and the longer sheathing petioles I do not find all the leaves bipinnate, as Bertoloni describes them, the upper-stem leaves being pinnate with very long linear segments, and ultimately simple linear elongate, my plant, so far, looking like an intermediate variety

I have no doubt as to the identity of the Gloucestershire plant with the foreign ones above mentioned, and the Toulouse specimen referred to by Mr Babington (Man Br Bot 130) seems to agree with my description, so that *Œ pimpinelloides* must resume its place in the flora of Britain

I next come to the *Œ peucedanifolia* of Smith, Hooker, Babington, and all British botanists, but not of Pollich, or the principal foreign writers I agree with Bertoloni in confirming the opinion of Bieberstein (Fl Tauro-Caucas iii 232), that his *Œ silaifolia* is the *Œ peucedanifolia* of Smith (Eng Bot t 348) I found this plant in a salt-marsh near Portmarnoch, county Dublin, Ireland, and have received it from the banks of the

Severn at Deerhurst, Gloucestershire, where it was gathered by Mr E Lees The following description will establish the identity —

*Œnanthe silaifolia* —Radix e napulis oblongis clavatis fasciculatis in fibrillam desinentibus Caulis teres, striatus, fistulosus, alterne ramosus, 1—2-pedalis Folia radicalia , cætera omnia subconformia, bipinnata; foliolis fere æqualibus, pinnulis acutis integerrimis, inferiorum lanceolatis, superiorum linearibus, folia suprema pinnata Petioli inferiores elongati basi vaginantes, superiores omnes breves 1—2 pollicares Umbellæ solitariæ, 5—8-radiatæ, primaria (in speciminibus nostris) subsessilis, accessoriæ ramorum terminales longiuscule pedunculatæ Involucrum universale nullum seu foliolis 1—7 setaceis, umbellam sub mediam longis Umbellulæ multifloræ densæ, floribus externis longius pedicellatis, sæpe (semper?) sterilibus internis subsessilibus Involucella e foliolis plurimis, latiusculis albo-marginatis nonnullis basi connatis, umbellula florigera exigua paulo brevior Marginis calycini liberi segmenta præ corollam magna, lanceolata, tria exteriora longiora Petala minuta, parum inæqualia, late obcordata, ad tertium fissa Styli divergentes Stylopodium majusculum, conicum Diachenium (haud omnino maturum) exiguum, clavatum (ad basin ut videtur haud incrassatum), inferne quidquam contractum

Comparing the description of Bieberstein, referred to above, with those of Koch and Bertoloni, there can be but little doubt that this plant is the Œ *silaifolia* of those writers The two latter authors differ in one respect, Koch describing the fruit as cylindrical and "basi callo cinctis," as noticed by Babington, it is probable however that the same plant is intended by both these distinguished writers This species, which differs from all its allies by the similarity of structure in all the leaves and the shorter and uniform leaflets, is further distinguished from the true Œ *peucedanifolia* by its very much smaller petals and fruit, and from Œ *Lachenalii* by the structure of the root

By far the most common species of this group is the Œ *Lachenalii* of Babington, and apparently the plant of Gmelin, Koch, DeCandolle and Bertoloni I may premise that there is some difference in the various descriptions of the root, upon which, owing to the general neglect of this portion of most plants amongst British botanists, my specimens do not allow me to give an opinion The exact Bertoloni says, "fibris inferne incrassatis in napulos cylindraceo-clavatis fibrilla terminatis," whilst Koch and Babington seem to intend fibres thickened and tuberous from the top I have specimens of this plant from several parts of England, from the coast of Galloway and from near Dunbar in Scotland I do not find the difference which Mr Babington suspects between the fresh and salt water forms* The following is the description —

*Œnanthe Lachenalii* —Radix Caulis erectus, striatus, fistulosus seu subfarctus, alternè ramosus, 1—3-pedalis Folia radicalia pinnata, pinnis pinnatifidis trifidisve inæqualibus segmentis obverse lanceolatis obtusis venosis, petioli mediocris longitudinis basi vaginante, caulina pinnata longe petiolata pinnis trifidis segmentis linearibus acutis valde elongatis, successiva minora, demum simplicia, segmentis semper inæqualia Umbellæ solitariæ, terminales, 5—15-radiatæ, longe pedunculatæ Involucrum universale 0 seu 1—6-phyllum, foliolis linearibus acutis umbella multo brevioribus Umbellulæ multifloræ, floribus externis sterilibus longius pedicellatis, internis subsessilibus in fructu fastigiatæ Involucella umbellula brevior e foliolis lanceolatis margine pallentibus nonnullis basi connatis Petala radiantia quam in *Œ silaifolia* paululum majora profundius obcordata Styli diachenio breviores, parum divergentes Stylopodium majusculum, conicum Diachenium basi non calloso semper angustatum, variat tamen magnitudine et forma, interdum majus usque ad summum dilatatum quasi obconicum, interdum (præ siccitate ut videtur) minus, sub calyce (diviso in segmenta erecta inæqualia) constrictum

In foreign specimens from the Bolognese Apennines, the fruit is more exactly as described by Koch The form of the lower leaves is very constant in all the forms of this otherwise variable species The variation in the form of the fruit is very singular, but with the specimens before me I cannot refuse to believe it

A word as to the value of the characters of these species The position and size of the tubers of the root are, I suspect, of doubtful constancy, observation must determine their importance The general disposition and proportions of the leaves are probably much to be depended upon here and throughout the whole order The hollowness or solidity of the stem depends, I believe, almost wholly on the place of growth, and is of no moment The involucre is most variable The petals vary somewhat in size but scarcely in form, those of the outer sterile floret being always compared with each other The form of the fruit seems not so constant as might be expected The presence or absence of the incrassated summit of the pedicel I have never seen to vary

I need scarcely add, that the above descriptions are taken exclusively from the British specimens referred to

Dublin, March 10, 1844

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* No difference exists between them —C C Babington

## III —*Descriptions of new species of* Melania *collected during the Voyage of H M S Sulphur* By RICHARD BRINSLEY HINDS, Esq

1 *Melania fumosa* Testa elongata, crassiuscula, lævigata, olivaceo-fusca, unicolore, vel junioribus infra suturam strigis longitudinalibus rufis ornata, anfractibus paulisper rotundatis, superne late subconcave coarctatis, lineis impressis sparsim et obsolete cinctis, spira erosa apud anfractum quartum, apertura cærulescente Axis truncatus 29 lin

*Hab* New Ireland in the streams about Port Carteret.

2 *Melania aspirans* Testa elongate subulata, lævigata fusca, unicolore, anfractibus numerosis, subplanulatis lineis arcuatis incrementi fere minute pliciformibus ultimo ad basin striato, sutura lineis impressis comitata, apertura cærulescente, columella albida Axis 23 lin

*Hab* Feejee Islands, in the rivers

3 *Melania Plutonis* Testa pyramidato-subulata, subturrita, lævigata, nitida aterrima unicolore anfractibus paulisper rotundatis, ultimo magno rotundato apertura cærulescente Axis 23 lin

*Hab* Feejee Islands in the rivers

Very pyramidal in its shape, and the last whorl displays a far greater proportion than is usual, otherwise its characters are perfectly passive The apex is erose to the fifth or six whorl

4 *Melania figurata* Testa elongate subulata, lævigata, polita fulva anfractibus numerosis subrotundatis superne strigis rufis longitudinalibus infra lineis interruptis transversis seriatim dispositis ornatis infra suturam pliciferis ultimo ad basin striato apice eroso, apertura cærulescente Axis 22 lin

*Hab* New Ireland in the streams

The ornation of this species is eminently distinguishing, otherwise it is a smooth, elongated tawny shell, like many others The middle and inferior portions of each whorl are adorned with transverse rufous interrupted lines, disposed in regular series round the shell, and present a pretty appearance on its pale yellow semitransparent surface

5 *Melania picta* Testa elongate subulata fusca anfractibus numerosis, subplanulatis, plicatis transversim sulcatis strigis rufis longitudinalibus ornatis infra suturam uniseriatim tuberculatis apertura cærulescente Axis 19 lin

*Hab* New Ireland, in the streams

This species closely resembles *M subulata* of Sowerby's 'Genera,' not of Lamarck, the figure there given does not represent some of the characters dwelt on in the above description, and I am not aware that a diagnosis anywhere exists

6 ***Melania luctuosa*** **Testa subulata, turrita, fusca, anfractibus planulatis, fere subconcavis, transversim lineis impressis cinctis, strigis rufis longitudinalibus interruptis ornatis, spira paulisper erosa, apertura cærulescente Axis 13 lin**

*Hab* Feejee Islands, in the rivers

So contracted are the whorls here as in some cases to be not only flattened but even concave, particularly towards the last whorl

7 ***Melania perpinguis*** **Testa elongata, fusca, strigis rufis longitudinalibus plerumque ornata, anfractibus rotundatis, subturritis, lineis transversis impressis exculptis, spira subplicata, apud extremitatem erosa, apertura cærulescente, ad peripheriam ustulata Axis 14 lin**

*Hab* Feejee Islands, in the rivers

8 ***Melania occata*** **Testa ovata elongata, lutescente, anfractibus paucis, rotundatis, exaratis lyris intermediis angustis acutis, spira apud anfractum quartum erosa apertura cærulescente Axis 12 lin**

*Hab* River Sacramento, California

The rounded whorls are ploughed into numerous furrows, and the intervening ridges are comparatively narrow and keel-shaped, the lower part of the aperture is somewhat dilated, and slightly disposed to elongate in the manner of *Io*

9 ***Melania mæsta*** **Testa ovata, elongata, fuliginea, infra epidermidem albida anfractibus rotundatis superne angulatis et excavatis, transversim lineis impressis striatis, spira apud extremitatem erosa apertura ustulata, ad basin subtruncata Axis 15 lin**

*Hab* Feejee Islands in the rivers

The slightly concave area of the whorl beneath the suture, which occurs in this species, is shared with a few others In the present, it influences the shape of the aperture, straightens the outer lip, provides it with an angle above, and truncates it below The margins of the aperture have the colour of burnt umber

10 ***Melania verrucosa*** **Testa subulata, subturrita, lutea, anfractibus octonis planulatis longitrorsum obtuse plicatis lineis tribus transversis intersectis harum intervallis obtusis quadratis tuberculosis, apice vix eroso, apertura elongata, lutescente Axis 10 lin**

*Hab* New Ireland, in the streams

11 ***Melania fulgurans*** **Testa obeso subulata, lævigata polita, lutescente, strigis rufis angulatis fulmen simulantibus conferta anfractibus decenis subrotundatis, spira leviter plicata exserta, vix erosa, apertura ovali, cærulescente Axis 13 lin**

*Hab* New Ireland, in the streams

Few species of *Melania* have the pretensions to beauty of this

The shell is subulate, with the inferior whorls obese, smooth and polished, the whorls about ten in number and slightly rounded, those towards the apex indistinctly plicated, spire exserted and scarcely eroded The base colour is a pale yellow, densely crowded with transverse angular dark red markings

12 *Melania florata* Testa ovato elongata polita, cornea, tessellata, anfractibus paucis, subrotundatis, seriebus tribus macularum rufarum quadratarum eleganter ornatis, serie suprema præcipue maxima, intermedia minima, anfractu ultimo ad basin punctato, spira erosa, apertura cornea Axis 6½ lin

*Hab* New Ireland, in the streams

This also is a pretty species with a pale surface, each whorl being ornamented by three series of transverse reddish spots, of which the superior is the largest and most deeply coloured, the two others are punctations of reddish spots, the inferior being intermediate in size Very delicate striæ, not easily recognizable, traverse the shell transversely

13 *Melania gaudiosa* Testa ovato elongata, lævigata, polita cornea, anfractibus octonis subplanulatis, unicoloribus, spira oblique plicata ad extremitatem erosa apertura ovali, cornea Axis 9 lin

*Hab* New Ireland, in the streams

Approaches somewhat closely, in general character, the American shell, *M plicifera*

14 *Melania pyramidata* Testa elongate subulata, gracili nitida cornea, anfractibus decem subplanulatis transversim distanter striatis, superne intra suturam fusco anguste fasciato ultimo ad basin puncticulato, spira versus extremitatem plicata, erosa, apertura ovali Axis 9 lin

*Hab* New Ireland, in the streams

15 *Melania latebrosa* Testa ovata, elongata, sordide fusca, anfractibus perpaucis rotundatis, lineis impressis transversis instructis, erosis usque ad penultimum, apertura parva, ovali, cærulescente Axis 8 lin

*Hab* New Ireland in the streams

A small obese shell, with little to distinguish it beyond its few rounded whorls furrowed transversely with parallel impressed lines, and its comparatively small, neat, oval aperture

16 *Melania pugilis* Testa spinosa, elongate ovata, fulva, anfractibus circa novem, rotundatis, superne spiniferis infra suturam serie unica macularum rufarum inferne seriebus duabus minoribus cinctis ultimo ad basin multiseriato, spinis distantibus, ad peripheriam quinque, truncatis linea angulata alligatis, spira subtruncata apertura oblique ovali subattenuata albida Axis 14 lin

*Hab* New Ireland, in the streams

Shell ovate, pale yellow, whorls ventricose, spiniferous, of an uniform colour in the middle, above adorned with a single series of red markings, longitudinal or nearly square, below with two series of smaller spots placed on bands slightly paler than the neighbouring shell, the last whorl exhibits at its base several series of these articulated bands, the spines are distant and truncated to near their base, about five occupy the circumference of a whorl, and an angular line connects each with its neighbours, he spire has scarcely lost more than its extreme whorl by erosion, and the aperture is white, and in a slight degree attenuated at its base.

17. *Melania bellicosa.* Testa spinosa, ovata valde truncata, fusca, anfractibus tribus rotundatis, transversim striatis, spiniferis, frequenter erosis, spinis aculeiformibus, subrectis ad basin decurrentibus; spira apud anfractum antepenultimum truncata, apertura elongate ovali, subfusca. Axis 9 lin.

*Hab.* Feejee Islands, in the rivers.

Nearly allied to *M. spinulosa*, Lamarck, which is found in the rivers of Timor.

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## IV.—*Contributions to British* Jungermanniæ. By Thomas Taylor, M.D., F.L.S., &c.*

1. Jungermannia nimbosa, *Tayl. MSS.* Caule laxe cæspitoso, erecto subramoso: foliis laxis subsquarrosis: lobo *inferiori* obovato subacuto, patenti, *superiori* minori, obovato erectiusculo, subimbricato, cauli adpresso: utrisque margine ciliatis, subconnexis.

On the summit of Brandon mountain, county of Kerry. 1813.

Stems growing up through tufts of *Musci*, reddish brown, 2—4 inches long, leaves, except at the very base, nearly of the same size, the lower lobe patent or deflexed, and so the shoots have a squarrose appearance: their texture is of very minute cells, their *ciliæ* distant and large, the connexion between the upper and lower lobes is very short.

This was taken for *Jung. nemorosa*, L., when first brought down from Brandon Hill. It differs, however, by the taller size, the more deflexed lower lobes of the leaves, the slight joining between their lobes, and by the more considerable and more distant *ciliæ* of their margins.

From *Jung. planifolia*, Hook., which accompanied it, the present is known by the more squarrose leaves, the stronger ciliation of their margins, the more considerable connexion between the lobes, and the more concave and less imbricated leaves. The calyx has not been seen, nor indeed has the plant been found again by the numerous acute observers that have ascended its native mountain

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* Read before the Botanical Society of Edinburgh, 9th May 1844.

2 Jungermannia curta, *Martius* Caule subcæspitoso, abbreviato, adscendente, foliis inferioribus multo minoribus, subimbricatis, apice dentatis, lobo *inferiori* obovato, planiusculo, *superiori* minori, acuto, inferiorum subquadrato

*Scapania curta* Nees, Lindenberg et Gottsche, Synopsis Hepaticarum, p 69, Hooker s Brit Jung t 21 figs 17, 18 and 19

So variable is this species, that in the 'Synopsis' no less than nine varieties are distinguished This will account, in some degree, for the late period of recognizing this species in Britain In Ireland it occurs in a great variety of situations, on stones on mountain sides facing the north, but its most favourite locality is in old woods on damp rocks, as at Cromaglown near Killarney The size is so variable, that some states closely resemble *Jung nemorosa*, L, a species, perhaps, the most difficult to understand of any of the genus

3 Jungermannia Thuja *Dicks* Caule cæspitoso, adscendente, subpinnatim ramoso, supra convexo, glabro, foliis arcte imbricatis, lobo *inferiori* patenti oblongo, recurvo integerrimo, *inferiori* ovato obtusiusculo, margine reflexo, stipulis oblongis, acutis integerrimis margine reflexis, apice recurvis perichætii lateralis emergentis foliis majoribus ciliato-serratis

On stones, side of Lough Finnehy, near Dunkerron, co of Kerry

Tufts wide, olive-green, the older parts purplish brown, shining, the shoots acuminated In plants with *perichætia* the branches are very short Mr Dickson long since found this plant on the sides of mountain lakes in Scotland, and very properly judged it to be distinct from *Jung platyphylla*, L He gave, however, no diagnosis, whence the two have been confounded by all subsequent writers

It may be known by its greater size, its shining surface, its acuminate shoots, its denser structure, its *perichætia* prominent beyond the cauline leaves, its perichætial leaves larger, wider, more divergent, and always ciliato-serrate, its divisions less regularly pinnate, the closer imbrication of the leaves, and the more patent position of their inferior lobes

4 Jungermannia rivularis *Nees* Caule cæspitoso subpinnatim ramoso, adscendente, foliis approximatis, patentibus, lobo *superiori* ovato-rotundato, plano, *inferiori* minuto, ovato, obtuso, utroque integerrimo stipulis minutis obovatis integerrimis

On stones in streams at Dunkerron co of Kerry

Tufts wide, loose, dark green, the younger shoots of a lively green Stems 1—2 inches long, irregularly branched, scarcely pinnate, branches short, patent Leaves oblongo-rotundate, sometimes a little narrower at the top, quite entire, their structure densely and minutely cellular The lower lobe is more minute in proportion to the upper than in any of the congeners the stipules are scarcely wider than the stems

Through the kindness of Dr Gottsche, who sent me specimens from Hercynia, I have been enabled to identify this species, which I had long considered something more than a variety of *Jung platyphylla*, L The fructification I have not seen

5 JUNGERMANNIA DILLENII, *Tayl MSS* Caule cæspitoso erecto apice incurvo, subramoso, foliis imbricatis, semiverticalibus, erecto-patentibus secundis obovatis dentatis, margine utroque recurvo, basi decurrentibus, calycibus ex angusta elongata basi oblongis compressis ore truncatis crenatis, segmentis dentatis

*Lichenastrum*, no 6 Dillenii Muscologia p 483 t 69 f 6 A, B, C

On sandy banks of streams in woods, at Gortagaree and Blackwater co of Kerry

Tufts wide, dark green Stems about an inch high, sparingly branched, curved at the top Leaves convex towards the anterior margin

Dillenius distinguished the present from *Jung asplenioides*, L, they have been confounded by all succeeding writers This species may be recognized by the obovate leaves, which have no appearance of being truncate at their tops, by their being more crowded, nearly vertical, dentate throughout, by both their margins being recurved, and hence appearing convex in front, by their less patent position, by the greater length of their decurrent bases, very essentially by their smaller cellules, and by the mouth of the calyx having large crenulations, which are themselves denticulate Besides, the tufts are of a darker green, and the shoots more slender

6 JUNGERMANNIA AQUILEGIA, *Tayl MSS* Caule cæspitoso, prostrato, subpinnato, ramis complanatis, foliis imbricatis, erectiusculis, convexis, integerrimis, lobo *superiori* obovato-rotundato margine recurvo, *inferiori* minori subquadrato ex tumida involuta basi apice adpresso perichætialibus oblongis transversalibus deflexis, calycibus elongate obconicis truncatis integerrimis

*Jung complanata, β minor*, Hook Brit Jung t 81 f 17

On rocks over which water continually trickles

Patches wide, shallow, brownish olive Stems 1—4 inches long, irregularly pinnate, the branches nearly at right angles to the stem Leaves from a narrow base, flatly cup-shaped, their lower lobe swelling out at its involution, while their angulate tops lie closely adpressed to the inside of the upper lobe

This species differs from *Jung complanata*, L, by the smaller and more convex leaves, their olive-brown colour, their lesser lobe not sharply reflected upon the upper but having a tumid base, by the deflexed perichætial leaves, by the *perigonia* occurring usually at the termination of the shoot and not on proper short lateral branches, and by the angulate portion of the lower lobes of the leaves being shorter This species prefers very wet surfaces of mural rocks, while *Jung complanata*, L, is partial to trees

## V —*Descriptions of some* Chalcidites *of North America, collected by* George Barnston, Esq By Francis Walker, Esq, F L S

The two hemispheres of the earth are said to be represented in their climate and productions by the higher mountains, whose tops are compared to the poles, and the plains whence they arise to the equatorial line The vegetation and animals on one side of a mountain range are often very different from those of the other side, while on its summit they are alike Thus also in proportion as we are more remote from the poles and nearer to the tropics, we find creatures more numerous and more various, due allowance being made for the soil, elevation, size and form of the land In entomology, the land within the Arctic circle comprises one insect region, and of the territories surrounding it have been formed three regions, that of North America, that of Europe, and that of Siberia The insects here described were taken at Martin's Falls, Albany River, Hudson's Bay*, which is contained in the North American region I am indebted to G Barnston, Esq, for this opportunity of adding to the knowledge of the geography of the *Chalcidites*

Callimome splendidus, *Barnston's MSS* fem *Viridis cupreo varius, abdomine purpureo antennis nigris, pedibus rufis alis subfulvis* (Corp long lin 2, alar lin 3)

Body convex, thinly clothed with hairs head and thorax minutely squameous, the scales on the head and on the fore part of the thorax so disposed as to form little transverse undulations head green æneous in front, as broad as the thorax eyes and ocelli red mandibles fulvous antennæ black, clavate, pubescent, shorter than the thorax, first joint fulvous, long, slender, second long-cyathiform, third and fourth very minute, fifth and following joints to the eleventh successively shorter and broader club linear, conical at the tip more than twice the length of the eleventh joint thorax elliptical, green prothorax transverse, forming beneath in front a slender neck which joins the head, its breadth more than twice its length scutum of the

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* See "Observations on the progress of the seasons as affecting animals and vegetables at Martin's Falls, Albany River, Hudson's Bay, by G Barnston, Esq, in the Edinburgh New Philosophical Journal, vol xxx 1840-41

mesothorax long, sutures of the parapsides distinct, approaching each other, axillæ large, triangular, not conniving, scutellum nearly rhomboidal metathorax cupreous, transverse, very short propodeon cupreous large, subquadrate almost horizontal having a few little ridges along the middle podeon extremely short abdomen elliptical, purple, very minutely squameous, varied with green on each side, nearly as long and as broad as the thorax, metapodeon occupying more than one-third of the dorsum slightly dehiscent on the middle of the hind border, having a little channel at the base, octoon a little shorter than the metapodeon ennaton much shorter than the octoon decaton still shorter, protelum, paratelum and telum very short segments of the thorax beneath partly cupreous very minutely squameous, having a suture along the middle ventral segments of the abdomen concealed by those of the dorsum sheaths of the oviduct black, pubescent, a little longer than the abdomen legs pale red, coxæ green, scaly wings slightly tinged with yellow nervures fulvous humerus much less than half the length of the wing, ulna much shorter than the humerus, radius much shorter than one-fourth of the length of the ulna cubitus not half the length of the radius stigma of moderate size, emitting a thick branch towards the tip of the radius

Callimome Cecidomyæ, fem *Aureo viridis, antennis nigris, pedibus flavis viridi et fusco vittatis alis limpidis* (Corp long lin $1\frac{1}{4}$, alar lin 2)

Body bright golden-green, convex head and thorax finely squameous, the scales on the head and on the fore part of the thorax so disposed as to form little transverse undulations head as broad as the thorax antennæ black subclavate pubescent shorter than the thorax, first joint long slender, green, fulvous at the base, second cyathiform, third and fourth very minute, fifth and following joints to the eleventh successively but very slightly shorter and broader, club linear, conical at the tip, a little broader than the eleventh joint and more than twice its length thorax elliptical prothorax transverse narrower in front its breadth more than twice its length scutum of the mesothorax long, sutures of the parapsides distinct, approaching each other, axillæ large, triangular, not conniving, scutellum somewhat rhomboidal metathorax transverse, very short propodeon transverse, rather short very slightly decumbent podeon extremely short abdomen fusiform, smooth, shining, narrower but not longer than the thorax, blue towards the base, the segments, excepting the metapodeon, very minutely squameous, metapodeon occupying less than one-third of the dorsum, slightly dehiscent on the middle of the hind border, octoon and ennaton of moderate length, decaton longer than the ennaton, protelum shorter than the ennaton paratelum still shorter, telum very short sheaths of the oviduct black pubescent much longer than the abdomen legs yellow, coxæ green, a longitudinal stripe of green on each of the metafemora, and the same of fuscous on each metatibia, mesotarsi and metatarsi straw colour fuscous at the tips wings limpid, broad, very long, reaching when at rest to half the length of the sheaths of the oviduct, nervures piceous, humerus much less than half the length of the wing, ulna much shorter than the humerus, radius hardly longer than one-sixth of the ulna cubitus half the length of the radius, stigma small, emitting a very short branch

Parasitic on *Cecidomya communis*, Barnston s MSS

Lamprotatus Diæus, fem *Æneus, antennis nigris, pedibus rufis femoribus viridibus alis limpidis* (Corp long lin 1, alar lin $1\frac{3}{4}$)

Body convex, æneous head and thorax finely squameous head transverse, short a little broader than the thorax antennæ black, subclavate, a little shorter than the thorax; first joint long, slender æneous, second cyathiform æneous, th[illegible] fourth joints very minute, fifth and following joints to the t[illegible]ansverse, successively shorter and slightly increasing in breadth club conical, more than twice the length of the tenth joint thorax elliptical prothorax transverse very short rounded in front, much narrower than the mesothorax scutum of the mesothorax broad, sutures of the parapsides very distinct, approaching each other, axillæ large, triangular not conniving scutellum narrow, somewhat rhomboidal metathorax transverse very short propodeon transverse, obconic, decumbent podeon very short abdomen elliptical slightly keeled beneath, a little narrower but not longer than the thorax, metapodeon occupying less than one-third of the dorsum octoon not half the length of the metapodeon ennaton shorter than the octoon, decaton a little longer than the ennaton protelum and paratelum each as long as the decaton, telum very short ventral segments hidden by those of the dorsum oviduct concealed legs dull red coxæ æneous thighs æneous green, mesotarsi and metatarsi pale red, their tips fuscous wings limpid nervures fuscous humerus much less than half the length of the wing ulna not more than half the length of the humerus, radius longer than the ulna, cubitus much shorter than the ulna, stigma small, emitting a short branch

Pteromalus puparum, *Linn* &c

*Female* —Scales of the scutellum more minute than those of the scutum of the metathorax propodeon having a rim on each side abdomen oval, concave above, pilose towards the tip, metapodeon smooth, occupying more than one third of the dorsum, octoon of moderate size very minutely squameous, as are all the following segments, ennaton shorter than the octoon, decaton shorter than the ennaton, protelum, paratelum and telum of equal length, each a little longer than the decaton, dorsal segments hiding those beneath the abdomen, leaving a passage for the oviduct

Reared from the pupa of *Vanessa Cardui* by Mr Barnston This insect inhabits Europe, and has been found in Finmark, within the Arctic circle It is a means ordained by Providence to counteract the otherwise too great increase of butterflies belonging to the genera *Pontia* and *Vanessa*

**Encyrtus Bolus**, fem *Ater, antennis pedibusque nigris genubus fulvis, tarsis piceis, alis albis* (Corp long lin $\frac{1}{2}$, alar lin $\frac{3}{4}$)

Body black, convex shining, slightly punctured head transverse short, vertical as broad as the thorax antennæ clavate, black, as long as the thorax, first joint long stout second cyathiform, third and following joints to the ninth small, successively shorter and broader, club fusiform, nearly as long as all the joints from the third to the ninth thorax elliptical prothorax transverse extremely short, not visible above scutum of the mesothorax large, having a slight channel along its disc parapsides united with the scutum axillæ triangular, scutellum small metathorax transverse very short propodeon obconic declining podeon extremely short abdomen fusiform concave above longer and narrower than the thorax legs black, knees fulvous, tarsi piceous middle legs having the tibiæ and tarsi long and large as usual wings white, rather small nervures fuscous humerus less than half the length of the wing, ulna thick very short radius still shorter than the ulna, cubitus much longer than the ulna, stigma small emitting no branch

Reared from a species of *Coccus*? that infests willow-twigs

**Tetrastichus granulatus**, fem *Barnston's MSS* Tetrastichus Agathocles? A N H 1 *Æneo viridis antennis fuscis, pedibus flavis femoribus viridibus, tibiis nonnunquam fuscis, alis limpidis* (Corp long lin $\frac{1}{2}$—$\frac{2}{3}$, alar lin 1—$1\frac{1}{4}$)

Body æneous-green, shining slightly convex very minutely squameous, thinly pubescent head very short impressed between the eyes as broad as the thorax eyes and ocelli red one of the latter in advance on a line between the other two antennæ fuscous clavate pubescent, shorter than the thorax first joint long slender second cyathiform fourth joint shorter and broader than the third but longer and narrower than the fifth club elliptic broader than the fifth joint and about twice its length thorax elliptical prothorax transverse, very short scutum of the mesothorax very large having a slight furrow along the middle sutures of the parapsides very distinct approaching each other, axillæ rather large not connivıng scutellum somewhat rhomboidal having a longitudinal furrow on each side metathorax transverse, very short propodeon transverse, rather short slightly decumbent podeon extremely short abdomen oval depressed, shorter and a little broader than the thorax, metapodeon large, octoon and following segments to the telum successively shorter oviduct concealed legs yellow, coxæ and thighs green, tibiæ sometimes fuscous, tips of the tarsi fuscous wings limpid, nervures fulvous not much more than half the length of the wing, humerus rather short, ulna as long as the humerus radius extremely short, cubitus long, rather less than half the length of the ulna but more than twice the length of the radius, stigma very small, emitting a short branch

## VI —*Descriptions of some British* Chalcidites By FRANCIS WALKER, Esq, F L S

Eurytoma tumida, mas et fem *Atra, brevis gibbosa, alta, antennis pedibusque nigris, genubus tarsisque rufis, alis limpidis, nervis piceis* (Corp long lin 1, alar lin 1¾ )

*Male* —Body convex head and thorax roughly punctured head a little broader than the thorax antennæ setaceous, nodose, verticillate pilose, as long as the thorax , first joint long slender , second cyathiform third and fourth very minute , fifth and following joints hardly dilated, appearing more approximate than in the following species, *verticillata, Serratulæ, curta Abrotani, apicalis, collaris, annulipes, atra* and *Argele* thorax somewhat obconic prothorax a little narrower than the head quadrate , its breadth rather more than twice its length mesothorax more convex than that of the following species *verticillata, Serratulæ curta annulipes rufipes, Scultenna* and *Sittace* , scutum large, broader than long sutures of the parapsides very distinct approaching each other , axillæ or paraptera large, triangular, separated above by a space nearly equal to the scutum between the base of the parapsides , scutellum somewhat conical, truncate in front, abruptly decumbent behind and thus forming nearly a right angle metathorax very short appearing transversely after the hind border of the scutum propodeon (usually termed metathorax) large obconic furrowed distinctly along the middle, but less clearly on each side more abruptly decumbent than in the following species, *verticillata Serratulæ, curta Abrotani annulipes, rufipes, Scultenna* and *Sittace* podeon slender cylindrical punctured as long as the propodeon abdomen short oval smooth shining, much compressed, hardly longer than high, subtriangular when viewed sideways (being flat beneath and forming above an angle whose sides are convex), shorter than that of *verticillata, Serratulæ* and *curta* , metapodeon large, having no channel , octoon ennaton and decaton of moderate size , protelum, paratelum and telum very short wings broad , humerus slender, much less than half the length of the wing , ulna thick, much less than half the length of the humerus , radius much shorter than the ulna , cubitus as long as the radius , stigma small emitting a short branch

*Female* —Head as broad as the thorax antennæ shorter than the thorax thicker, shorter and more clavate than in the following species, *verticillata, Serratulæ curta, annulipes rufipes, Sittace* and *Argele* fifth and following joints to the ninth long successively decreasing in length , club fusiform, twice the length of the ninth joint podeon much shorter than the propodeon abdomen much longer than that of the male, shorter than that of *verticillata, Serratulæ* and *collaris,* fusiform, convex and keeled beneath, slightly compressed, its length considerably exceeding its height , segments from the metapodeon to the decaton large above much contracted on each side, approximate and conniving together beneath metapodeon of moderate size octoon, ennaton and decaton large , protelum very short above, much dilated on each side and concealing the ventral segments , paratelum and telum very short above but broader on each side

Eurytoma Argele, mas et fem *Atra, convexa, vix gibbosa, antennis pedibusque nigris, genubus tarsis protibusque rufis, alis limpidis, nervis fuscis* (Corp long lin 1½, alar lin 2½ )

*Male* —Body convex head and thorax roughly punctured head a little broader than the thorax antennæ setaceous, nodose, verticillate pilose as long as the thorax , first joint long, slender , second cyathiform , third and fourth very minute , fifth and following joints subquadrate, dilated, successively decreasing in size each having a narrow stem about half its length thorax nearly obconic, less convex than that of *verticillata*, *Serratulæ*, *rufipes*, *tumida* and *platyptera* prothorax quadrate, a little narrower than the head its breadth rather more than twice its length scutum large, broader than long , sutures of the parapsides very distinct approaching each other , parapteraa large, triangular, separated by a space nearly equal to the scutum between the base of the parapsides , scutellum nearly conical, truncate in front, less decumbent behind than that of *verticillata*, *Serratulæ*, *curta*, *annulipes*, *rufipes*, *Scultenna Sittace*, *tumida fumipennis platyptera* and *Abrotani* metathorax very short appearing transversely behind the scutellum propodeon large obconic, more horizontal than that of *verticillata Serratulæ*, *curta Abrotani annulipes*, *rufipes Scultenna* and *Sittace*, having only one broad shallow channel along the middle podeon slender, cylindrical, punctured, longer than the propodeon abdomen very short smooth shining not much more than half the length of the thorax abruptly decumbent in front and near the tip , its length slightly exceeds its height metapodeon less than one fourth of the length of the abdomen, having a short longitudinal channel at the base , octoon of moderate size, nearly as long as the metapodeon , ennaton very large , decaton small , protelum, paratelum and telum very short wings broad , humerus much less than half the length of the wing ulna less than half the length of the humerus, more slender than the ulna of *verticillata*, *Serratulæ*, *curta Abrotani annulipes*, *rufipes Micipsa*, *brevicollis* and *nitida* , radius as long as the ulna , cubitus nearly as long as the ulna stigma small, emitting a short branch

*Female* —Head as broad as the thorax antennæ slightly clavate, shorter than the thorax first joint long, slender , second cyathiform , third and fourth very minute , fifth and following joints to the ninth long but successively shorter , club fusiform, twice the length of the ninth joint podeon much shorter than the propodeon abdomen smooth, shining, slightly compressed gradually decumbent towards the base and towards the tip, somewhat shorter than the thorax , its height more than half its length , segments not much contracted beneath , metapodeon rather large , octoon and ennaton of moderate size , decaton large above, short beneath protelum, paratelum and telum very short oviduct concealed

Eurytoma Sittace, fem *Atra, convexa, vix gibbosa, antennis pedibusque nigris, tibiis fuscis, genubus tarsis et protibiis rufis, alis limpidis, nervis fulvis* (Corp long lin 1 , alar lin 2¼ )

Body convex head and thorax roughly punctured head as broad as the thorax antennæ slightly clavate, shorter than the thorax, first joint long slender, second cyathiform, third and fourth very minute, fifth and following joints to the ninth long but successively shorter club fusiform twice the length of the ninth joint thorax somewhat obconic less convex than that of *verticillata Serratulæ rufipes tumida* and *platyptera* scutum of the mesothorax large broader than long, sutures of the parapsides distinct approaching each other, axillæ large triangular not conniving, scutellum truncate conical abruptly declining at the tip where it forms nearly a right angle metathorax transverse very short propodeon large, obconic, abruptly declining, furrowed distinctly along the middle but less clearly on each side podeon much shorter than the propodeon abdomen oval smooth shining slightly convex not much compressed as long as the thorax, its height little more than half its length the segments gathered together beneath metapodeon, octoon and ennaton of moderate size, decaton very large protelum paratelum and telum very short oviduct concealed wings broad humerus much less than half the length of the wing ulna less than half the length of the humerus, slender like that of *E Argele*, radius shorter than the ulna, cubitus as long as the radius, stigma small, emitting a short branch

Eurytoma Scultenna, mas *Atra convexa vix gibbosa antennis pedibusque nigris, genubus tarsis protibiisque flavis alis limpidis nervis pallide fuscis* (Corp long lin $1\frac{1}{4}$, alar lin $1\frac{3}{4}$)

Body convex head and thorax roughly punctured head a little broader than the thorax antennæ setaceous nodose, verticillate-pilose as long as the thorax first joint long slender, second cyathiform, third and fourth very minute fifth and following joints subquadrate, hardly dilated successively decreasing in size joined closely together like those of *E tumida* thorax somewhat obconic less convex than that of *verticillata Serratulæ rufipes tumida* or *platyptera* prothorax transverse quadrate, not narrower in front, its breadth rather more than twice its length scutum of the mesothorax broader than long sutures of the parapsides distinct, approaching each other axillæ large triangular not conniving scutellum somewhat conical truncate in front abruptly decumbent at the tip where it nearly forms a right angle mesothorax transverse very short propodeon large obconic abruptly declining furrowed indistinctly along the middle and less clearly on each side podeon cylindrical slender dull punctured, as long as the propodeon abdomen oval smooth shining compressed abruptly decumbent in front and towards the tip, little more than half the length of the thorax, its height does not equal its length, metapodeon occupying more than one third of the dorsum having a longitudinal channel, octoon rather large, ennaton very large, decaton of moderate size, protelum, paratelum and telum very short wings broad, humerus much less than half the length of the wing, ulna thick, not half the length of the humerus, radius much shorter than the ulna cubitus a little shorter than the radius, stigma small, emitting a short branch

Eurytoma Micipsa, mas *Atra, convexa minime gibbosa antennis pedibusque nigris genubus rufis, tarsis piceis, alis subfuscis* (Corp long lin 1, alar lin $1\frac{1}{2}$)

Body convex head and thorax roughly punctured head a little broader than the thorax antennæ slender setaceous, longer than the thorax joints from the fifth to the ninth elliptical, hardly dilated joined together by slender stalks about half the length of each joint thorax somewhat obconical less convex than that of *verticillata, Serratulæ rufipes, tumida* and *platyptera* prothorax quadrate, its breadth more than twice its length scutum of the meso thorax broader than long, sutures of the parapsides distinct, approaching each other, axillæ large, triangular, not conniving, scutellum somewhat conical truncate in front not falling behind so deep as in the species above mentioned metathorax transverse very short propodeon large obconic more horizontal than in the following species *verticillata Serratulæ, curta, Abrotani, annulipes, rufipes Scultenna* and *Sittace* and having only one broad shallow channel along the middle podeon cylindrical, slender dull, punctured as long as the propodeon abdomen oval smooth shining compressed abruptly decumbent at the base and towards the tip, little more than half the length of the thorax, its height is not equal to its length metapodeon less than one third of the length of the abdomen decumbent in front, octoon of moderate size, ennaton large, decaton of moderate size protelum, paratelum and telum very short wings moderate, humerus much less than half the length of the wing ulna rather thick less than half the length of the humerus radius much shorter than the ulna cubitus as long as the radius, stigma small, emitting a short branch

Isosoma Nepe mas *Atrum prothoraci macula utrinque fulva, antennis pedibusque nigris, genubus rufis, tarsis piceis, alis subfuscis, nervis piceis* (Corp long lin 1 alar lin $1\frac{1}{2}$)

Body black convex cylindrical head and thorax punctured, head a little broader than the thorax antennæ slender, filiform clothed with long hairs, somewhat shorter than the thorax, first joint slightly bent, dilated beneath, second short-cyathiform third and fourth very minute, fifth and following joints to the eleventh long cylindrical nearly equal in size or successively, yet very slightly, shorter and broader tip of the eleventh joint pointed prothorax very finely rugulose, somewhat shining rather broader than long, a little shorter and more slender than that of *I vacillans,* from which it differs also in having a smaller pale fulvous spot on each fore corner mesothorax dull, sutures of the parapsides very distinct, approaching each other, axillæ large triangular not conniving, scutellum obconic, having a rim round its hind border which is more obtuse than that of *I longulum, petiolatum,* and *hyalipenne* metathorax transverse, very short propodeon dull obconic decumbent, coarsely punctured, and having here and there some large shallow excavations podeon long stout cylindrical dull punctured abdomen elliptical, smooth, shining, not compressed, scarcely more than half the length of the thorax, a little narrower and less convex than that of *I longulum* and of *I longicorne*, metapodeon large conical, occupying about half the dorsum, octoon scarce more than one-fourth of the length of the metapodeon, ennaton much longer than the octoon, decaton much longer than the ennaton protelum paratelum and telum very short legs black, knees fulvous, tarsi fuscous, paler beneath wings slightly fuscous, nervures fuscous, humerus much less than half the length of the wing rejecting beneath a short branch, ulna more than half the length of the humerus, radius less than half the length of the ulna cubitus a little shorter than the radius, stigma small

Decatoma Nicææ, fem *Fulva dorso antennisque nigris, pedibus flavis, tibiis fusco cinctis alis subfuscis nervis flavis ulna stigmateque fuscis* (Corp long lin 1, alar lin 1½)

Body convex head and, thorax rugulose, punctured pubescent, slightly shining head yellow, piceous on the vertex, as broad as the thorax antennæ dark piceous clavate, shorter than the thorax first joint long slender, second long-cyathiform, fulvous at the tip, third and fourth very minute, fifth and following joints to the ninth successively decreasing in length club broader than the ninth joint and more than twice its length thorax yellow, long-obconic hardly gibbous prothorax large, quadrate broader than long, fuscous on the middle of the hind border mesothorax piceous, varied with yellow on each side, scutum transverse, parapsides prominent their sutures distinct, axillæ large, scutellum large, obconic abruptly declining at the tip metathorax transverse very short propodeon short, obconic, abruptly declining piceous before, behind and along the middle podeon minutely punctured not one-sixth of the length of the abdomen, abdomen fulvous elliptic not gibbous keeled beneath, longer and slightly narrower than the thorax having the disc above and the hind borders of the segments piceous, metapodeon shorter than one fourth of the dorsum octoon much shorter than the metapodeon, ennaton longer than the octoon, decaton twice the length of the ennaton, protelum more than half the length of the decaton, paratelum and telum very short oviduct just passing the tip of the abdomen legs yellow, metatibiæ mostly fuscous wings limpid nervures fuscous humerus yellow shorter than half the wing, ulna slender, not one-sixth of the length of the humerus radius longer than the ulna, cubitus as long as the radius, stigma of moderate size

## VII —*Characters of a new Species of* Axolotl

### By Prof Owen, F R S

### Genus Axolotes*

*Gyrinus*, Shaw, *Phyllhydrus*, Brooks, *Siredon*, Wagler, *Axolotl*, Humboldt and Cuvier

Sp 1 *guttata* *A* fusca nigra guttata, capite antice rotundato, cauda compresso-lanceolata

Shaw, Nat Misc no 343, *Gyrinus mexicanus*, Gen Zool iii p 612 pl 140, *Siren pisciformis*

Humboldt and Cuvier, Voyage de Humboldt, Zoologie, 2<sup>eme</sup> partie, Reptiles douteux p 109 pl 12, *Axolotl du Mexique*

Home, Phil Trans 1824, p 419 pl 22 and 23, *Mexican Proteus*

Wagler, Icones Amphib tab 20, *Siredon Axolotl*

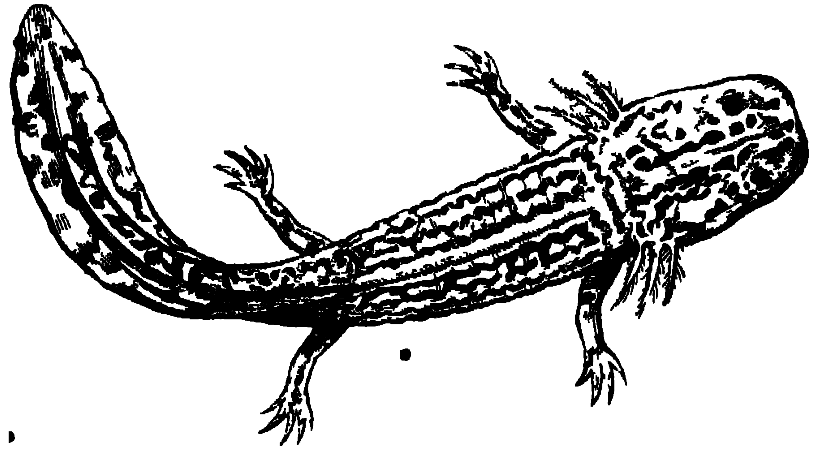
Longitudo 7 unc ad 14 unc

*Hab* In lacu juxta urbem Mexico

Sp 2 *maculata* *A* grisea, nigro marmorata, subtus lactea, capite antice truncato, cauda compresso-rotundata

Longitudo 3 unc ad 5 unc

*Hab* In Mexico, in fluviis Sierræ Madre, Chihuahua, lat 26° 6′ N, long 106° 50′ W



*Axolotes maculata*, nat size

## VIII —*On Ova believed to be those of the Large Spotted Dog-fish,* Scyllium Catulus, *Linn* (sp)

About the middle of the month of December last, there were sent to the Belfast Museum two plants of the tangle (*Laminaria digitata*), dredged together off Killinchy, Strangford lough, from a depth of between two and three fathoms and having many large and remarkable ova attached to them by tendrils like those on the well known "purses" as they are called of the common dog fish (*Scyllium Canicula*) though they evidently belonged to a different species They were new to me and interesting in several respects To the one plant of tangle were attached fourteen to the other twelve of these ova of the fourteen six were very old six of middle age, ' and two quite fresh—of the twelve attached to the other plant four were very old, four of middle age, and four quite fresh Those called fresh had the "white and yelk" as in a newly laid hen s egg, from those termed of middle age the young fish had probably long since escaped none remained to bear testimony to its species The age of the different ova was denoted not only by their own appearance, but by that of the mollusca zoophytes, &c parasitical upon them —on the oldest were *Anomiæ* an inch in diameter, *Discopora hispida* *Tubularia ramosa* *Cellularia reptans* all full grown, and on them, and those of middle age were *Lepraliæ* (Johnston) of various species, *Nulliporæ*, and masses of the ova of *Buccinum undatum*

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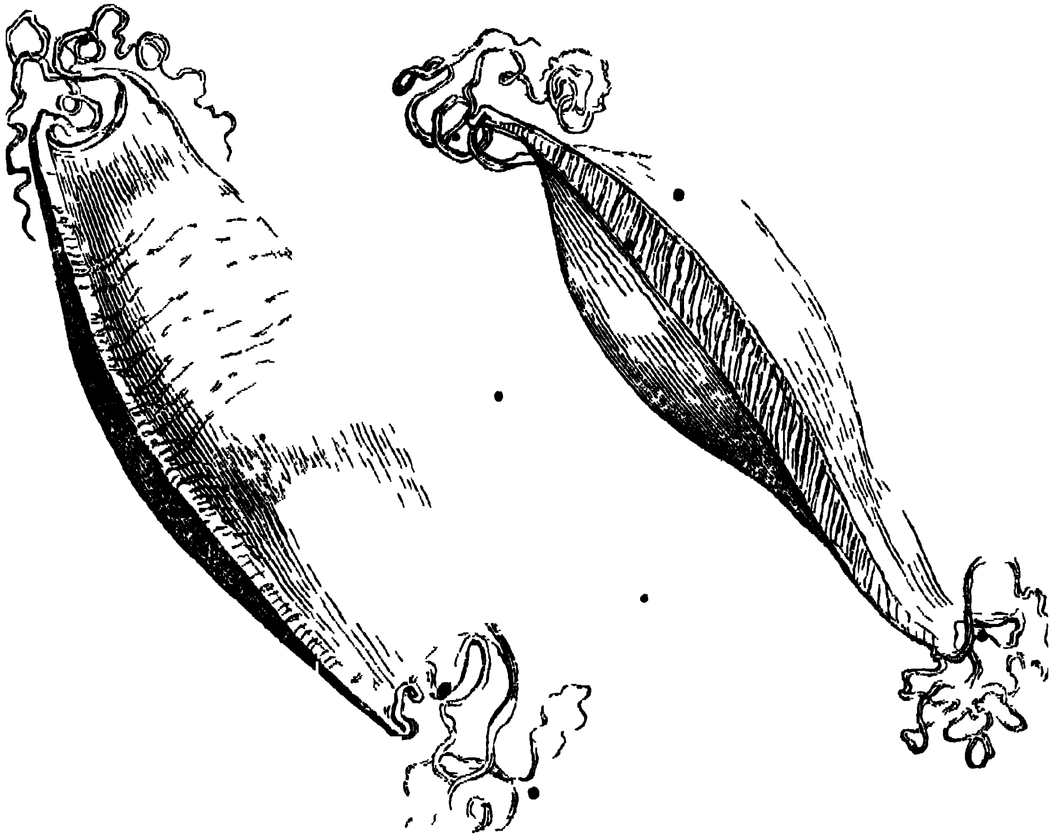
* This rendering of the Mexican word, first applied generically by Cuvier, has long been adopted by Mayer and other German anatomists the word is inflected according to the third declension—*Axolotes, is, em, ibus* The characters of the first known species, for which the trivial names '*mexicana*' and '*pisciformis* have ceased to be distinctive, are prefixed to render those of the second species more intelligible

The number of ova of different ages suggested certain points of inquiry Their deposition at three different periods of time on the same plant led to the suggestion that the fish may like certain birds as the different species of *Hirundines* for example, return time after time to the same spot to deposit its eggs * We can indeed only infer that the same individual has deposited the ova on the different occasions, but the probability is in favour of such inference That the salmon (*Salmo Salar*) returns to its native river—if not to the same bed to spawn—we have a notable example in the north of Ireland where from the circumstance of the fish of the adjacent rivers Bann and Bush being distinguished from each other by certain peculiarities those of every age from each river in returning to the fresh water from the sea are known always to seek the ascent of their native stream

Being unable to find any ova described like those under consideration I made a sketch of one and submitted it to my friend Mr Yarrell for his opinion together with several queries remarking at the same time that as ' the ova are evidently generically related to those of *S Canicula* the first impression is, that they are those of the most nearly allied species *Scyllium Catulus*, especially as we find those of the next nearest ally, at least among British species—*Squalus annulatus* Nils (*Pristiurus melanostomus* Bonap )—to be of a different form but that if they belong to *S Catulus* which is said not much to exceed *S Canicula* in size it will be singular that the ova should so greatly exceed those belonging to that species as to be double their size and in consequence of their much greater strength about four times their weight The transverse markings represented in the drawing denote plaits which give to the exterior a handsome appearance, but they are not of specific value, the surface of some ova being quite smooth, of others partially or wholly plaited It was added— Is it known *how often* the *Scyllia* deposit their ova ?

*how many* are deposited at one time? how long after deposition the young fish bursts its prison?' In the event of Mr Yarrell's not knowing the ovum (which proved to be new to him likewise), he was requested to send the drawing &c for Mr Couch's opinion With respect to *S Canicula* Mr Yarrell remarked,—

'I never remember to have observed more than one egg in each oviduct ready for exclusion, but there was frequently one other in each oviduct at the upper end or about to separate from the ovarium, one on each side How long they are in passing along the oviduct, how often deposited and how soon after deposition the young fish leaves his cell are points unknown to me, but I suspect in reference to gaining his liberty the young fish is rather in a hurry for I have more than once taken very small spotted sharks swimming at large before the membranous bag of nutriment had been taken up into the abdomen, and before the young shark had begun to take food by the mouth I will, however send your sketch and queries to Mr Couch'



This gentleman replied,—

"Polperro, Jan 25, 1844

"DEAR SIR—I feel an impression that the figure of a 'purse which I received in your letter of the 24th of December is that of the large spotted dog-fish, *Scyllium Catulus* Both the British spotted dog fishes certainly spawn twice in the year as do many other species of fishes that are not commonly supposed to do so, a fact which I have ascertained by observation and dissection But I have been somewhat unfortunate in reference to the larger spotted dog-fish in not being able to obtain the ova of that fish directly from the body, a circumstance which arises from this fish going into deep water at the spawning time, when our fishermen do not find it convenient to follow them I have obtained specimens however which I have been given to understand proceeded from this fish and they very closely resemble the pencil drawing in size, form the raised ridge at the sides and in the lengthened tendrils at the corners, the colour a dark brown, but I never saw any specimen with transverse plaits, which may throw doubt on the fact of its appropriation*

'The ova of the *Scyllia* are deposited in pairs, an ovum descending at the same time to each corner of the uterus, but I am not able to say how many constitute one laying except that they are numerous They certainly remain a considerable time before exclusion a month or two at least, and perhaps more for the corals to which they have been attached and especially the *Gorgoniæ* are often seen growing luxuriantly round the tendrils in a manner to show that most of this growth must have taken place since the deposit Sometimes also their surface is studded with small shell fish as *Anomiæ* and Pectens of a size to render it probable that the time I have assigned to them may even have been exceeded

'JONATHAN COUCH'

As, reasoning from analogy, I came to the conclusion that the ova must be those of *S Catulus* and as Mr Couch has received similar ones which were stated to be the produce of this fish, I have thought it desirable to publish so much as we know of the subject, and to give a figure of the ovum, although actual proof is still wanting as to the species to which it appertains Some of my queries to Mr Yarrell bore on the subject noticed in the conclusion of Mr Couch's letter Were it known how long the ova of the dog fish were deposited before the young fish escaped, we could say that the adherent mollusca zoophytes, &c must have attained a certain growth within a limited period, but our information is not yet sufficiently positive on this head The most newly-deposited ova under consideration were externally quite free from all parasitical growth which was at first sight or before they were opened, a good indication of their freshness But whatever the time may be in which the ovum of the allied species *S Canicula* is deposited before the exclusion of the fish, proof is afforded by one in my collection containing a young dog-fish of this species all but ready for its escape, that before its birth would have taken place the *Discopora hispida* attached to the out side of its case had arrived at full maturity†

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* As before mentioned, these plaits are not of specific value —W T

† Since the above was written, I have seen in the collection of Mr R Ball, Dublin, a similar case containing a young *S Canicula*, on the exterior of which were groups of *Lepraliæ* of the full ordinary size, and two specimens of *Serpula triquetra* nearly an inch in length

Length of recent* ovum of *Scyllium Catulus*? 4 inches 6 lines, breadth 1 inch 9 lines, depth 3—4 lines, surface smooth or plaited transversely, sides very strong and closely plaited throughout, tendrils very strong. Colour a uniform brown, but differing in shade in different ova.

Belfast, May 1844. **Wm Thompson.**

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## IX.—*Description of a minute Alga from the coast of Ireland.* By Wm Henry Harvey, Esq.

[With a Plate.]

RHODODERMIS, Harv. MS.

Gen. Char.—*Frons* carnoso-membranacea, expansa, crustacea facie inferiore adhærens, e cellulis polygonis *sanguineis* minutis formata. *Fructus*? verrucæ pertusæ in frondem sparsæ.

*R. Drummondii* Harv. MS.

*Hab.* At New Castle, co. Down, spreading over the rocky sides and bases of maritime caves, in places where it is covered by the sea at high water but exposed, on the ebb of the tide, to the dripping or trickling of fresh water. *Dr Drummond*, May 1840.

*Frond* spreading in wide, concentric, but not regularly circular patches of a dark blood or brick-red colour, when dry purplish lake, closely adhering to the rocks on which it grows, and to which it is attached by the whole of its lower surface, of a fleshy-membranous, very tenacious substance, glossy, about half a line in thickness in the centre, but becoming gradually thinner toward the margin, composed (as shown by the highest power of the microscope) of strata of minute polygonal cellules closely packed together, and filled with brilliant rosy endochrome. The surface appears marked with wavy interrupted lines, and more or less thickly furnished with wart-like dark-coloured tubercles, which are either scattered or grouped together in linear masses. These tubercles are hemispherical, prominent, of the same structure as the rest of the frond, deeply coloured at the margin, but in the centre colourless, and generally pierced by a hole which goes through the frond. It is doubtful whether they contain the fructification. Dr Drummond was not able to discover sporules in any of them in the recent plant, nor have I been more fortunate with the dried specimen. In outward aspect they much resemble the fruit of *Grateloupia*, but a minute examination shows them to be invariably empty.

Though undoubtedly of marine origin, the presence of some fresh water in the absence of the tide seems favourable to the growth of this Alga, as Dr Drummond observed the colour to be much more intense and brilliant in places where the fresh water dripped or trickled over the rocks than where they were comparatively dry. In the first of these the crust was of "a dark blood-colour," in the last "a brick-red." But among the former he observed some patches which were "a bright orange." This he attributed to a fuller state of fructification, but neglected to put up specimens. It may, however, be doubted whether this last colour did not originate in an excess of fresh water, which we know changes to orange the red of many *Florideæ*, as particularly observed in *Nitophyllum versicolor*.

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* The specimens have dwindled in drying to about one-half their original size.

Probably this production is common in similar situations on other of the British coasts, but, with numerous others of the crustaceous class of Algæ (a neglected group, which will repay in novelty an observer who has patience to look for them), has been hitherto unnoticed or passed by. Though our information respecting it is still imperfect, its characters are such as to exclude it from any established genus with which I am acquainted. The brilliant red colour and substance sever it from *Ralfsia*, Berk. (*Padina? deusta*, Hook.), which in habit it more nearly resembles than any other British plant; but this is a resemblance of habit alone, and therefore more one of analogy than affinity. With the Mediterranean *Peysonellia* it has, seemingly, more affinity, and it is in the neighbourhood of that genus that I propose, for the present at least, to place it. W. H. H.

### EXPLANATION OF PLATE II.

Fig. 1. *Rhododermis Drummondii*, natural size.
Fig. 2. Portion near the margin, magnified.
Figs. 3 and 4. Different views of tubercles.
Fig. 5. Portion of the surface highly magnified.

## X.—*Researches on the Organization of the Invertebrate Animals of the Western Coast of France.* By M. de Quatrefages. Communicated by Alfred Tulk, M.R.C.S.

The admirable report of M. Milne Edwards upon this subject, to which want of space in a recent number of this Journal admitted only of briefly directing the attention of the reader, contains amongst others a most valuable series of observations by M. Quatrefages relative to the organization of certain Gasteropoda, which have hitherto been incorrectly associated with the genus *Doris* under the general title of Nudibranchiata, but which differ much, through the degradation of their internal structure, from all the ordinary Mollusca. As regards the general form of their body, the generative organs and the position of the central nervous ganglia, these animals resemble the other Gasteropoda, but are widely separated from the normal type of that group by the structural conditions under which the functions of *circulation*, *respiration* and *digestion* are performed The great physiological distinction in the nature of the *circulatory apparatus* of the class *Mollusca* and *Articulata* consists in its being provided in the former with two systems of membranous vessels united at one end by the intervention of a heart, and communicating at the other by a network of capillaries, while in the latter one of these systems (the afferent or venous) is always wanting, and is supplied by lacunæ or intervals between the different organs, within which the blood flows Some years ago M Quatrefages had determined the fact, that in the compound *Ascidia* and several other molluscoid animals, the vascular system only existed in the thoracic region of the body, and was replaced throughout the abdomen by interstitial meatuses resembling those in the Articulata, and that in the Bryozoa the inferior representatives of the same zoological type, there existed no blood-vessels whatever, and the nutrient fluid was distributed through large cavities of the body Hitherto however no true mollusk was known in which the circulation was not completely vascular, nor could it have been well anticipated that one of the highest groups of the class should present the contrary character! still the Eolidians and other analogous Gasteropoda have furnished such a structural degradation in different degrees In the first a well-developed heart and arteries exist, but no proper veins, the blood being returned by means of a system of irregular lacunæ similar to those met with in the Crustacea, while in other species both the heart and arteries have disappeared, and the circulation becomes as incomplete as in the Bryozoa

Corresponding modifications are entailed by the above in the structure of the *respiratory* organs There are no branchiæ or pulmonary sacs in the present Gasteropoda, as in the ordinary Mollusca respiration is either simply exercised by the general surface of the integument, or limited to particular appendages upon the back of the animal, but even in the latter case no vascular network enters into their composition, and to supply this deficiency, nature has introduced a combination of the *digestive* with the respiratory system, that was hitherto believed to occur only in the Medusæ and different Entozoa The digestive cavity gives off a system of canals, the ramifications of which penetrate the branchiform dorsal appendages, and within these the nutritive matters, being directly conveyed, are submitted to the influence of the air before being sent to the various parts of the body This complex vasculo-gastric system has been elaborately studied by M Quatrefages in the genus *Eolidina*, in others it is constructed upon a more simple plan, reminding us of that of the digestive cavity in some *Hirudines* and *Planariæ*. In the genera *Pelta* and *Chalidis* no ramified appendages are found, but only two large sacs, into which the alimentary substances enter and remain for some time.

The nervous system is also less perfect than in the ordinary Gasteropoda, and approximates the Tunicata, the postœsophageal or ventral ganglia, and the transverse commissure uniting them and completing the œsophageal ring posteriorly, being frequently wanting, as are likewise the labial ganglia.

For the reception of these peculiarly-organized Gasteropoda, M. Quatrefages proposes the establishment of a new order in that class, to be called PHLEBENTERA, and which, with the genera already mentioned, must include the genus *Actæon*, confounded hitherto with the Aplysians, and, in all probability, *Glaucus*, the Placobranchiata, and all other Gasteropods deprived of lungs and vascular branchiæ. Lastly, certain *Planariæ* may perhaps be inserted under the same group.

M. Quatrefages has also given to science a most instructive memoir upon those polyps which, under the form apparently of rugose amorphous crusts, are frequently found upon the whelk-shells inhabited by the Paguri or hermit-crabs; the species had however always been confounded with the *Hydra squamata* of Muller, and neither its structure or mode of reproduction had been studied. These polyps, designated by our author under the name of *Synhydra parasita*, live attached by their base to a common laminiform floor supported internally by a corneous network and analogous to the polypary of the *Gorgonia*, but of a more simple structure, resembling that of the skeleton of the sponge. Thus associated simply in colonies by their bases, we might suppose that each individual polyp exercised its functions independently of another; but they are in fact all united by a system of capillary canals lodged deeply within the common basilar tissue, and which establish ready communications between their respective stomachs.

The same arrangement for rendering the alimentary matters digested by a single polyp available to the nutrition of the entire colony may be observed also in the *Alcyonia*, the *Corallinea*, the *Gorgonia*, *Cornularia*, &c., but previous to the discovery of M. Quatrefages was unknown to occur in the Hydras. Another particularly interesting fact is the singular structure of a certain number of these polyps thus united in a kind of tuft. The one kind present the usual form of Hydras, having a mouth surrounded by filiform tentacles, so that they can directly obtain food, while the others are destitute both of oral orifice or appendages, and depend solely for nutrition upon the products of digestion in the former being conveyed to them by the system of canals already mentioned Living thus as parasites, they yet perform important uses in the œconomy of the polypary, since, charged with the process of reproduction, they appear specially destined to ensure the establishment of new colonies

M Quatrefages has seen the *Synhydræ* propagate by three very distinct methods In the one case the young individual proceeds from a bud formed upon the surface of the common basilar tissue, and which is developed nearly in the same manner as the reproductive gemmules of the Hydras and Sertularias, in another, ovules like those of the sponge arise in this common tissue, and lastly, reproductive bodies (*bulbilli*) are met with upon the free portion of the polyps, which cannot be likened either to gemmæ or ovules, for they grow by an extension of their tissue like the first, and, like the second, separate completely from the parent stem before becoming developed into new individuals The reproductive gemmules serve to increase the population of the colony in the midst of which they are formed, the ovules remain probably buried in the basilar tissue after the winter has destroyed the polyps covering it, and produce other Hydras on the following spring, while lastly the bulbilli, becoming detached and borne afar by the currents, fix themselves at length in some appropriate spot, develope, and multiplying again by gemmæ, found a new colony, in a manner similar to that by which the compound Ascidia disperse to a distance their sessile societies by means of locomotive larvæ These bulbilli are exclusively produced by the astomatous polyps, around the summit of which they are grouped, the polyps provided with a mouth appearing not to participate in any degree in the work of generation The first then are the reproductive, the second the nutrition-serving individuals, and both exhibit corresponding differences of structure The tentacles of the reproductive polyps are represented only by tubercles, and their digestive cavity resembles that of a polyp whose development is not completed and the stomachic cavity not yet open externally Arrested as regards the functions of nutrition and of animal life, all the energies of their organism seem concentrated upon the exercise of the generative power, for there is nothing that could lead us to suppose that the nutritory individuals are males, and the astomatous females, but rather that the two great physiological acts, the one necessary to the preservation of individual life, and the other destined to perpetuate the existence of the species, are here exhibited under a separate and independent form in the same community This mode of propagation by bulbilli in the *Synhydræ* constitutes a form of reproduction not hitherto well determined to occur in the animal kingdom; and we cannot therefore peruse the beautiful researches of M Quatrefages without feeling their interest no less as bearing upon general physiology than upon the special history of the polyps

A third series of researches by the same author has been devoted to the study of the organization of the Annelida, with a view of determining how the dominant type of that natural group is modified or lowered either in the inferior species, or in those worms which have been ranked by many zoologists among the Entozoa He has ascertained, in examining the comparative anatomy of the nervous system in *Eunice, Nereis, Phyllodoce, Glycera,* and some other newly discovered genera, that the ganglionic system is far more complex than has been supposed, and exhibits specific modifications analogous to those which have been observed in Insects and Crustacea

The *vascular* system in all the Annelida studied up to the present time by anatomists has been found to present a very considerable amount of development In some however, as in certain *Tubicolæ,* M Quatrefages has proved that the circulation is not performed by vessels, but through lacunæ situated between the different organs thus, in a species of *Amphicora,* very nearly allied to that discovered by M Ehrenberg, the blood, easily recognisable from its green colour, is not inclosed in vessels, but between the subcutaneous muscular layer and the kind of mesentery that envelopes the alimentary canal, and lastly, in a new genus of Annelida Errantia allied to *Syllis,* and called by our author *Doyeria,* there exist only imperfect rudiments of a vascular apparatus, which is reduced to a simple dorsal vessel

The genus *Aphlebine* of M Quatrefages furnishes another striking example of such organic degradation In the ordinary Annelida the circulation is performed as in the higher animals, by the alternate contraction and dilatation of a part of the vascular system, but in the present genus, the blood, instead of being propelled by any organ analogous to a heart, is set in motion by the repeated strokes of a series of microscopically minute palettes, which are composed of vibratile cilia united in that form, and placed upon the walls of the visceral cavity behind the base of each foot An analogous mechanism has been observed by Milne Edwards in the Beroes

The affinity of internal structure which previous observers had perceived to exist between the Annelida and Rotatoria has been rendered still more intimate by another discovery of M Quatrefages, who found upon the coasts of Brittany an Annelide much resembling in general conformation a young *Syllis,* but which supported upon either side of its body a series of locomotive organs analogous to the vibratile discs of the Rotifers, and so disposed as to simulate when in motion the revolutions of a paddle-wheel The feet in this singular Annelide, designated by the name of

*Dujardinia*, are furnished with bristles as in the other Annelida Errantia, but these are merely passive weapons of defence, since they remain perfectly immoveable Sometimes the animal changes its position in the water by agitating its tail briskly like a long oar, but in general it swims slowly by means of the above-mentioned lateral palettes, which consist of cilia circularly arranged upon the edges of cup-shaped cavities, supported by papillæ placed upon the sides of the body and between the feet In the form of its digestive tube and the large size of its ova, *Dujardinia* also approximates the Rotifera

Some further details are of interest from tending to indicate the links whereby the Annelida are connected to the *Planariæ* and Entozoa Thus the *Nemertæ* agree with the Annelida in the general arrangement of their vascular system, but resemble much the *Hirudines* in the structure of their buccal apparatus and many other points of internal organization, while their reproductive organs are analogous to those of many Entozoa, their nervous system may be compared to that of the *Linguleæ*, and their digestive tube, in place of extending the whole length of the body and opening posteriorly by an anal orifice, as in all the typical Annelida, terminates towards the anterior third of the body in a cul-de-sac which communicates externally by the mouth alone, as in some of the lower organized Entozoa and most Zoophyta

The very singular observations made by M Quatrefages upon the propagation of the genus *Syllis* have already been given in a previous number of this Journal It remains only for us to add, in respect to the Annelida, that in a large number of the Annelida Errantia and *Tubicolæ*, and also in the *Thalassemæ* and *Nemertæ*, which establish the passage between the ordinary Annelida and Entozoa, he has recognised the existence of distinct male and female individuals, has observed the formation of the spermatozoa in the *Nemertæ*, and by his remarks upon the development of the ova in the *Terebellæ*, has extended to the class Annelida the important fact determined by Herold, Rathke, and other embryologists, respecting the relation of the vitellus to the dorsal surface of the embryo in Insects, Arachnida and Crustacea

Lastly, M Quatrefages, in examining the mechanism of motion in the polyps of the genus *Edwardsia*, has arrived at the same conclusions with Mr Bowman relative to the theory of muscular contraction, for he has observed that the fibres of one and the same muscle do not all act simultaneously, but that those which contract, drawing along with them the adjacent fibres in a state of repose, give rise to the zigzag folds which have been considered as the efficient cause of the shortening of the muscle

Touching the subject of animal phosphorescence, our author has been led, from the microscopic study of the small transparent

Annelida, to infer that its production depends very intimately upon the influence exerted by the nervous system in giving rise to muscular contraction This, observes Milne Edwards, becomes highly probable from the fact, that in the Beroes of the Mediterranean Sea I have constantly remarked that their very brilliant light emanated from the ciliated sides of the body, the principal seat of the locomotive function

## XI —*Further Observations on the Ornithology of the neighbourhood of Calcutta* By Edward Blyth, Curator to the Museum of the Asiatic Society of Bengal *With Notes by* H E Strickland, M A

Calcutta, March 18, 1844

The cold season of 1843–44 having now terminated, and the time for collecting specimens of the feathered class fast drawing to its close, I shall again pass under review the various species of birds which I have hitherto succeeded in procuring in this immediate neighbourhood, a task to which I am partly impelled by perusal of Mr Strickland's interesting 'Notes' (vol xiii pp 32 *et seq*, *ante*), which have just reached me

Nos 1 and 4* *Palæornis Alexandri* and *P pondicerianus* Both of these are strictly hill species and I doubt if either of them is ever met with in the vicinity of Calcutta With reference to the enumeration of the species of this genus which I appended in a note I may remark that there is a "*Psittacus* (*Conurus*) *himalayanus*" of Lesson described in the 'Zoologie du Voyage de M Bélanger' p 239 which is doubtless a *Palæornis*, and would seem to resemble *P schisticeps*, except in having the under parts to the belly uniform ash gray "Inhabits the valleys of the Himalaya" I have never seen it

The *Psittaculus vernalis* appears also to be exclusively a hill species

Of the *Raptores*, I have prepared an elaborate monograph of the Indian species, wherein a very considerable number of synonyms have been reduced and which is at present awaiting publication

The whole of the true Falcons of India appear to visit this neighbourhood during the cool season, with the exceptions of *F Aldrovandi*, which I have only seen from the Himalaya, and the *F cherrug* of Hardwicke and Gray, which is evidently the lanner, *F lanarius*, and which is not yet well established as Indian, though the name *F cherrug* occurs in a MS catalogue of the birds of Nepal prepared by Mr Hodgson I have somewhere read that a large falcon called *Cherg* or *Cherrug* is highly esteemed in Persia for flying at bustards and other large game and there can be little doubt that the lanner exists along the Himalaya, especially towards the N W in the alpine Punjab Of the rest, I have obtained ***F shaheen***, Jerdon, and ***F vespertinus***, in addition to the species noticed in the catalogue, my friend Mr Earle tells me that he has shot ***F peregrinus***, and I am satisfied of the occasional occurrence of ***F juggur***, Gray and Hardwicke, vel *F luggur*, Jerdon

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* These numbers refer to Mr Blyth's paper, Annals, vol xii p 90, and vol xiii pp 113, 175

The word *Ierax* I so spelt to distinguish it in a more marked manner from the genus *Hyrax* among the mammalia I have one species from Assam, and another from Nepal and Arracan a third appears peculiar to the Malay countries, and a fourth inhabits the Philippines The true ***Falco cærulescens***, Linn, founded on Edwards, pl 108, is certainly a distinct species from any of the four known to me In the Assamese *I melanoleucos* nobis the tibial plumes are white, in the Nepalese ***I eutolmus***, Hodgson (*Falco cærulescens* var *a* Latham, from near Sylhet) they are bright ferruginous, and in the Malay species deep black Latham's description of Edwards's alleged Bengal species agrees neither with *I eutolmus* nor with *I melanoleucos*

No 9 I have instituted a division *Nisastur* for the reception of *Falco badius*, Brown, and the species allied to it conceiving that they do not range satisfactorily either in *Dædalion* (*Astur*, Bechstein) or in *Accipiter*[*]

No 14 This I fully suspect will have to be recognised as a distinct species from the European *Circus æruginosus*, v *rufus* in which case it will apparently stand as *C variegatus*, Sykes, and Latham's *Rufous-eared Falcon*, no 103, and *Konta Falcon*, no 117, are both referable to it If I remember rightly, M Lesson has some remarks on the Indian "variety" of *C æruginosus* in the 'Zoologie du Voyage de M Bélanger' The *extreme frequency* of specimens with ash-coloured tail and part of wings, as figured in Gould's 'Birds of Europe *from a Himalayan specimen*, first led me to entertain this suspicion, and the Indian bird appears also to be always smaller, to have the owl-like ruff more developed, and to be further distinguished by having golden-yellow irides Now of the considerable number of European specimens which I have seen I do not remember to have met with one having the ash-coloured wings and tail[†] nor do I think the irides were ever pure yellow Referring to M$^c$Gillivray's 'Rapacious Birds,' I observe he mentions the irides of the male to be "orange," and those of the female to be "reddish-yellow" Mr Jenyns, without distinguishing the sex, describes the 'adult in its fourth year" to have "reddish-yellow" irides, in the second year "brown," and in the young of the year "dusky-brown", but Montagu describes a female before him to have "yellow" irides, in which he is perhaps copied by Fleming None of these authors mention the presence of any ash-colour on the wings and tail, but I observe that Mr Gould's Himalayan specimen is noticed as "showing a curious change of plumage" by Sir W Jardine in the 'Naturalist's Library' So far from being unusual is it however in this neighbourhood, that I have seen two or three in the course of a day's excursion, and have had at least a dozen specimens thus coloured brought me within the last few weeks, and two or three only with dark wings and tail With respect to the size, Mr M'Gillivray assigns the following as the respective dimensions of the sexes of the British species Length to end of tail·21 and 24 inches, of wing $16\frac{1}{2}$ and $16\frac{3}{4}$ in, of tail 10 and $9\frac{3}{4}$ in (!), and alar expanse 50 and 52 in The dimensions of the Indian bird are 19 and $21\frac{1}{2}$ in, wing 15 and 16 in, tail $8\frac{3}{4}$ to 9 and $9\frac{1}{4}$ in, and alar expanse 45 and — ? In four gray winged males before me, the length of the wing varies from $14\frac{3}{4}$ to $15\frac{1}{2}$ in and in two dark-winged (young) males it is only $14\frac{1}{2}$ in In the gray-winged specimens, the pale head and throat never contrast remarkably with the rest of the plumage, as in the young of both sexes, and commonly in the European species, but the central dark lines to the feathers are usually much developed, often leaving but a slight lateral pale or rufous edge to each feather For a minute description however, I must refer to my 'Synopsis' of Indian *Raptores**

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[*] A recent skin has just been brought to me of a small *Accipiter* shot a few miles down the river, which is not improbably the *Khandesra* hawk which Mr Jerdon has been long trying to procure

[†] It is however certain that specimens so coloured do occasionally occur in Europe, as they have been accurately described by various authors from Brisson to Yarrell The scarcity of such specimens in Europe is probably owing to the influence of man, who usually destroys these birds before they become aged I do not therefore think that there is at present sufficient evidence to warrant the specific separation of the "Moor Buzzards" of India from those of Europe — H E S

No 15 This I suspect is the *Falco bido*, Horsfield, and the species would accordingly now stand as *Spilornis bido* *Falco albidus* of Cuvier and Temminck, v *Buteo melanotis* of Jerdon's 'Supplement,' is merely the young, as was first intimated to me by Mr Jerdon, an identification which I have since verified †

No 16 Mr Strickland, following Mr G R Gray is quite in error respecting the generic location of the birds which I formerly referred to *Spizaetus*, and which must now be restored to *Nisaetus* of Hodgson, a very distinct form, represented by the following Indian species —1 *N caligatus* (?), *Falco caligatus* (?) Raffles, *F niveus*, Tem, *N nipalensis*, Hodgson, *Bauj Eagle* and probably *Jerwied*

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* The European species may perhaps likewise be found here, in which case, however, I think it likely that such closely allied races would be apt to coalesce While treating of this genus, I would also suggest that the supposed female, *C Montagui*, described by Mr Selby to have the lower parts "orange-brown, without spot or streak," may possibly be an adult female of *C Swainsonii*

† Since the above was written, one of my shikarees has come in with a fine collection of *Raptores*, procured during an excursion towards the Soonderbuns Among them are two species which I have not procured before in this neighbourhood,—*Circaetus gallicus*, and a remarkable specimen of a crestless *Pernis*, which is the *P Ellioti* of Jerdon's list, and doubtless also that of Lesson in Bélanger's 'Voyage', I am not sure also that it differs specifically from *P apivora* [In a note dated three days later, Mr Blyth says, "I have got two more specimens of the *Pernis*, and these lead me to suspect that *P cristata*, *Ellioti*, and *maculosa* of Lesson are all one and the same ]

*Eagle* of Latham, nos 74 and 77 this bird is very common in Lower Bengal, and both sexes become wholly of a dusky black colour with full maturity, which renders the name *niveus* bestowed by Temminck peculiarly inappropriate *, in Southern India it does not appear to have been met with 2 *N cirratus* (Latham), founded on the *Crested Indian Falcon* of Willughby, *F cristatellus*, Tem, but certainly not *Spizaetus cristatellus* of Jardine and Selby's ' Illustrations of Ornithology', *N nipalensis*, crested variety, and since *N pallidus*, Hodgson nearly allied to the last, but distinguished by its splendid drooping occipital crest, which in a fine specimen before me (procured so near as at Midnapore) measures 5½ inches in length whereas in *N caligatus* (?) there is invariably but a slight indication of the crest common to the three other Indian species of this group, the shape of the dorsal feathers also well distinguishes this species from the preceding one 3 *N pulcher* Hodgson, and 4 *N Kieneri* which had already been thus identified by Mr Jerdon

To *Limnaëtus* may be referred the *Morphnus hastatus* of Lesson, v *Spizaetus punctatus* of Jerdon's Supplement, and *Cawnpore Eagle*, Latham, of which I have recently obtained two specimens in this vicinity, an adult and a young one, and Mr Jerdon informs me that he also has lately procured several, among which are pale varieties analogous to those of *Aquila nævia* (*Vindhiana* †)

I have also procured *Aquila mogilnik* (*imperialis*), *Aq nævia* (two adults beautifully spotted, another adult totally devoid of spots, but the feathers of both silky and finely glossed with purplish) the *Aq fulvescens*, Gray is the young, and several specimens of *Aq pennata* vel *Spizaetus milvoides* of Jerdon This last is of course the Indian variety of *Buteo lagopus* noticed by Latham and the reference of the same author to the Kites of India, which occurs in his description of the British kite, refers of course to the common Indian species, his *Cheela Eagle*, nos 66, 111, and 112

Nos 17 to 20, *Fishing Eagles* I shot a specimen of *Haliaëtus Macei* a few days ago, in a transitional state of plumage, passing from the *H lineatus* of Hardwicke's drawings into the *H unicolor*, ibid, which latter I see is considered by Prof Brandt as probably identical with *Falco leucoryphos*, Latham —vide vol xi p 114, *ante* That I have rightly identified the *H unicolor*, Gray, there can be no doubt whatever, and I very strongly suspect that to the *F leucoryphos* must be referred the *F ichthyaetos*, Horsfield, described in immature plumage and which would now accordingly rank as *Ichthyaëtus leucoryphos* This bird is very common in the Bengal Soonderbuns The *Hal blagrus* is considerably less so, at least to judge from the comparative number of specimens which are brought me but this also is far from being rare it is evidently the *Maritime Eagle*, no, 67, of Latham, as well as his no. 82, and in second plumage it is his *Kumpa-maur Eagle*, no. 72. *Pandion haliaetus* is also very common in the Soonderbuns, being of course the *Bengal Osprey* of Latham, but differing in no respect from the European species. For *Haliaetus pondicerianus* must now be read *Haliastur indus*.

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* This is analogous to the change which converts *Buteo lagopus* into the *B Sancti Johannis*, Auct Mr McGillivray was unaware of the occurrence of this bird in the dark plumage within the British Islands, but a specimen in the dress adverted to was obtained in Epping Forest by Mr Doubleday

† On further consideration, I feel very doubtful respecting the distinctness of this from *F limnaetus*, Horsfield

No. 22. The *Elanus melanopterus* of Bengal has always its outermost tail-feather from ⅜ to ½ inch shorter than the rest, which is the sole character upon which the Prince of Canino founded his American *E. dispar*; the adult is likewise always distinguished by a slaty-black spot at the extremity of the white on the under surface of the wing and immediately impending the base of the first primaries. Does this correspond to the oval spot of black mentioned as occurring in Gould's Australian *E. notatus**?

Respecting the Indian Vultures information concerning which is sought by Mr. Strickland, I have already informed you (vide vol. xiii. p. 115).

A superb living *Vultur cinereus* has been sent by Major Jenkins from Assam, which enables me to refer to this species beyond all doubt the so-called *V. monachus* figured by Hardwicke and the head alone of which is published by Gray. Latham describes this drawing under the head "Chocolate Vulture." My bird is now casting its first primaries and should therefore be in its second year, the colouring of the head being nearly as represented on the plate. In the breadth of skull and aquiline strongly hooked beak, this bird approaches the division *Otogyps*, and it has been separated by Mr. Hodgson under the somewhat strange name of *Polypteryx*.

Of Owls I have added to the catalogue *Ketupa Leschenaulti* which is by no means rare; *Urrua umbrata*, nobis, which is less common; and *Scops sunia*, Hodgson, of which beautiful little species I procured a pair that were taken with bird lime. There are no less than five Indian species of true *Scops* exclusive of *coromanda* which is probably an *Urrua*, Hodgson. The *U. coromanda* apud Hodgson, is my *U. umbrata*, and the same is evidently alluded to by Latham in his description of *Strix coromanda* as represented in a drawing which he saw in the possession of Sir Joseph Banks, the figure measuring 20 inches in length; but it cannot be the *Strix coromanda* of Hardwicke and Gray, being much darker in colour, in addition to its very superior size. Mr. Jerdon has also recently obtained *U. umbrata* in the south.

That *Strix hirsuta*, Tem. must be referred to the Sumatran *Str. scutulata* of Raffles, I have this further evidence, that the Bengal species is quite common about Singapore; and it is also the *Ominous Owl* of Latham, or *Col pecha* (death owl) of the Bengalees, by whom its cry is believed to forebode the death of any sick person within whose hearing it is uttered.

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* The above remarks are very important, as they seem to show that the *Elanus* of America and of Australia is the same species as that of the old world. The wing-spot in *E. axillaris*, Lath. (*E. notatus*, Gould), exactly agrees with Mr. Blyth's description, except in being *sooty black* and not "*slaty-black*."—H. E. S.

No 27 I observe that Sir W Jardine remarks, in the "Naturalist s Library (*British Birds*, vol i ), that—" Of the extra-European specimens of birds which are considered to be identical with the English barn owl, the under parts are always more tinged with ochraceous ' This however, certainly does not apply to the common Indian barn owl, which, as I before stated, differs neither in this respect nor in any other from the bird of Europe I have Calcutta specimens with under-parts of the most pure snowy-white, and others more or less coloured beneath, precisely as in those of England

No 27 *a* I have obtained *Ketupa Leschenaulti* half-grown, and from the analogy of plumage I feel confident that *Strix coromanda*, as figured by Hardwicke, is the young of my *umbrata*, but certainly not the true *coromanda*

No 31 This is *Buceros albirostris* of Shaw, a species which represents *B malabaricus* of the Indian peninsula in Bengal, Nepal, Assam, and to the eastward of the bay of Bengal Latham, however, has badly figured it as *B malabaricus* in his vol ii pl 38

No 32 I can perceive no good distinction between the Hoopoes of Bengal and Southern India, further than that the latter are rather smaller and considerably more deeply coloured The Bengal bird is decidedly the European hoopoe and the position of the white bar upon the tail varies in different specimens, being in some also much more oblique than in others

No 33 *a* I have obtained a single specimen of *Merops philippinus*

No 34 This common species is replaced in Assam, Tipperah, Arracan and the Tenasserim provinces by *Coracias assamensis* (M Clelland and Horsfield), which in those parts appears to be equally common

No 37 *Halcyon amauropterus* is found at all seasons, and may generally be met with in the Botanic Garden and one or two other localities I have also obtained *H atricapillus* which Mr Jerdon has likewise recently done in Southern India and *Todirhamphus collaris* *H coromandus* I have received from Nepal and from the eastern side of the bay

No 42 *Bucco caniceps* is common in the Soonderbuns, and to the eastward abounds in Tipperah and in Arracan

No 43 *Picus strictus* appears to be the *P goensis* of recent authors, but does not well agree with Daubenton's original description This and some allied species constitute my division *Chrysocolaptes* (Journ As Soc B no 59 p 1004) which I consider to be very distinct from Mr Strickland s *Brachypternus*, founded on *P aurantius*, v *bengalensis*

No 43 *a* *Picus* (*Gecinus*) *striolatus*, nobis, J A S B vol xii p 1000, has been procured near here by W Earle Esq

No. 48 I have obtained several specimens of *Yunx torquilla*

No 52 For notices of this extremely variable species, vide J A S B xi 908, and xii 241 and 944, where also are described several species of *Centropus* I may remark that I have received *Cuculus Sonnerati* from Singapore as well as from Southern India * *Eudy-*

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* Is not C *Sonnerati* the young of some other species?—H E S

*namys orientalis* was omitted by an oversight, and another species to be added to the list is *Phœnicophaus tristis*, the *Ph longicaudatus* of my monograph of oriental *Cuculidæ*

Nos 56 57 and 58 are true *Caprimulgi*

No 58 *a* *Caprimulgus indicus*, apud Jerdon, procured in this neighbourhood, and presented to the Society by my friend Willis Earle, Esq The same gentleman has also shown me part of a collection formed in Monghyr, a range of hills at no great distance up the river among which I perceive various species that do not occur in this immediate vicinity e g *Butastur* (Hodgson) *teesa* *Urrua bengalensis* (*Otus bengalensis*, Franklin, *Urrua cavearia*, Hodgson) *Picus mahrattensis*, *Zanclostomus sirkee*, *Lanius lahtora*, *L erythronotus*, *L Hardwickii*, *Malacocercus chatarhœa*, *Thamnobia fulicata* (the female of this is *Saxicolides erythrurus* Lesson in Bélanger s Voyage ) *Motacilla variegata* Lath (not of Vieillot, *M picata*, Franklin) *Sitta castaneoventris*, *Columba cambayensis*, *Philomachus ventralis*, *Cursorius asiaticus*,—and of species which are rare here, *Cuculus canorus* and *Oriolus aureus* of my list, both the latter and *O chinensis* I have also received from Midnapore I have also reason to believe that on the same range occurs the *Garrulax ruficollis* (Jardine) (*Ianthocincla lunata* M Clell ), of which I lately received a few specimens from Tipperah

No 59 *a* Add a *Cypselus* allied to *C australis* Gould, and identical with that received from the Deccan by Mr Jerdon as noticed in J A S B vol xi p 886

No 61 *Corvus macrorhynchos*, v *culminatus* A pair of these birds which I lately shot measured each 19½ inches by 3 feet in alar expanse, wing 12 in and tail 7¾ in Mr Jerdon, however gives length 21 in , of wing $13\frac{4}{10}$ in , tail 7¾ in , and Col Sykes assigns, length 14 in and tail 7 in ,' which *added together*, gives the same total dimensions as are stated by Mr Jerdon "It doubtless varies in dimensions like the next species

No 62 The variations of size in this most common species are very observable in the living birds Picking out a large and a small one, the former measured 17¾ in by 2 ft 8 in , wing 11 in and tail 7½ in the latter gave 15 in by 2 ft 5 in , wing 9½ in , and tail 5¾ in

No 63 Latham terms this *Corvus rufus* and rightly assigns to it one of its Bengalee names derived from its note , but I think it is more commonly styled *Takka-chore*, or "*Rupee thief*"

Nos 64 and 65 *Gracula indica* inhabits Southern India, and is the *Gr religiosa* of Mr Jerdon s list *Gr religiosa vera* inhabits the hilly parts of Bengal, and is common in Nepal and in the countries eastward of the bay

No 70 Mr Jerdon's *Pastor malabaricus* is probably the *P dominicanus*, apud Lesson, in the Zoology of M Bélanger's 'Voyage' vide J A S B no 9 for a notice of the Indian Mynahs and some additional species

[My genus *Trichastoma* certainly appears to be identical with Mr Eyton s *Malacopteron*, and my *Tr affine* is probably his *M cinereus*, but *Tr rostratum* must be distinct from *M magnum*, and I have other members of this group which will require subgeneric division ]

No 74 *Malacocercus terricolor* is badly figured by Edwards, pl 184, on which was founded *Turdus canorus* of Linnæus, a name which really cannot stand, as a more thoroughly songless bird does not exist, what cries it has are particularly harsh and chattering—*atch, atch, atch* The name *Baniahbou* (given it by Buffon) refers to the black-headed oriole, this being called *Saat bhye* (seven brothers), as they always go in families and *Chatarhœa* (though it is not the *Chatarhœa* of Franklin) which is a much smaller bird, more striated, and having a longer and more graduated tail

No 74 *a* Add *Malacocercus Earlei*, nobis

No 75 *a* My friend Mr Frith, a most accurate observer, assures me that *Timalia pileata*, Horsfield, is to be met with Mr Hodgson has sent it from Nepal, and it is included in Dr M Clelland s catalogue of the birds procured by him in Assam

No 76 Several common Taylor-birds were brought me the other day on the authority of which I can now safely assert that the *Orthotomus sepium* of Sykes is merely the young of *O longicauda* (his *O Bennetii*)

No 76 *a* *Prinia inornata* is common in grass-jungle and reeds, and it occurs also in Nepal This and other Indian *Priniæ* are decidedly congeneric with the *Drymoicæ* (Sw ) of Dr A Smith's 'South African Zoology '

No 76 *b* *Prinia flaviventris* is obtained within a short distance of this place This is the *Orthotomus flaviventris* of Delessert and I suspect *Motacilla olivacea* of Raffles, I had previously received it from Singapore and Tenasserim

No 77 *Iora tiphia*, distinct both from *I zeylonica* of Southern India, and from *I scapularis* of the Malay countries In reply to Mr Strickland s request, I may briefly remark that the anatomy of this bird is on the usual passerine type its food small insects, which it constantly seeks among the foliage and small twigs of trees, where it is ever in motion, attracting attention by its lively yellow colour, and more so by the great variety of its notes, these latter are much as in the *Pari*, and are so various as not unfrequently to occasion disappointment to the ornithologist, who had been thus led to suspect the presence of some unusual species, but its only proper song note is a very peculiar one, whence is derived one of the native appellations of the bird—*futtĭekjou*, the second syllable of this being excessively prolonged The nest is a beautiful structure, one before me being of a cup shape, resting upon and bound to a twig of guava, from which a slight stem branches off obliquely upward on one side, and the base of this is bound into the lower half of the nest, the rim and cupped portion are surprisingly thin, but still very compact, the nest being chiefly constru[illegible]d of fine cocoa-nut fibres, which form the interior lining, whilst the outside is bound and fastened with a profusion of delicate webs of leaf rolling caterpillars and spiders the eggs I have not seen This genus is undoubtedly very isolated in its affinities, but it certainly belongs to the great and much-varied *Timalia* series*

No 78 *a* *Turdus unicolor* Gould, must be added to the list, as I have obtained two specimens in this neighbourhood I have extensive materials on hand for a monograph on Indian Thrushes

No 79 The specific name *rubecula* was a slip of the pen on my part for *citrina*, though the former name is also erroneously included in the list of Assamese birds collected by Dr M'Clelland This species is the *Turdus Macei* of Vieillot, and also (as Mr Jerdon informs me) the *T albonotatus* Cuvier

No 81 Of a number of Dhyals received from Singapore I can perceive no difference from the Bengal bird in the male sex but the females have a black head and back, nearly as deep as in the males, whereas in the Bengal females the upper parts are always ash-gray Mr Swainson has subdivided the *saularis* into two or three species

No 82 In connexion with the Shahmoui, I may notice the nightingale termed *Bulbul Bhostah*, which is imported from the countries west of the Indus, and many are kept by some of the wealthy baboos, who purchase them at an enormous price These are carried about by their servants of a morning according to native custom and for these two or three months past some eight or ten have been thus daily brought to the fish-bazar, in cages wrapped round and round with cloth where the incessant noise and clamour excite them to sing the note I at once recognised of course though it scarcely seems to be equal to that of our English nightingale but I had some trouble to obtain a sight of one of the captives and then only *by main force*, when through the darkened cage I could perceive clearly enough that the bird was a true nightingale, and as far as I could make out, it was the British species, but of this I will not be positive† An ornithologist will, I am sure, appreciate the annoyance of continually hearing the note of some fine song bird in a closely covered cage and to be constantly refused a sight of it, to have *hookum nai* ( no orders ') as the invariable reply to your most civil requests to be allowed to view it there remained but one practicable alternative and of that I availed myself, the bird proving to be so perfectly tame and void of fear that there was no occasion whatever for covering it over, but it is the custom to do so, and that is sufficient reason to a Bengalee

Nos 84 to 88 Eight species of this group have been described by me in J A S B no 59 p 963 *et seq* as occurring in the vicinity of Calcutta

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* I am rather disposed to place *Iora* among the *Oriolinæ* The form of the beak and feet and the disposition of the colours, are very similar to those of *Oriolus*, and Dr Horsfield has lately obtained a new *Iora* equal in size to the small *Oriolus xanthonotus* This view is now confirmed by the interesting account given by Mr Blyth of the nidification of *Iora* Mr Jerdon has given me a similar account of *I zeylonica* he says it lays four eggs, pale reddish, with darker spots like those of *Hæmatornis* (*Pycnonotus*), and its chief food is spiders —H E S

† Since writing the above, I have looked at another, which I could see to more advantage the bird sung lustily all the while, and it decidedly appeared to be the British species

No 88 *a* I have just procured a second specimen of *Phylloscopus nitidus*, so that I have now confirmed all my described new species of this genus on a plurality of specimens

No 90 *a* Add a smaller species of *Acrocephalus*, allied to *A montanus*, and which I believe is the *Sylvia rama* of Sykes

Nos 92 and 93 These are species of true *Sphenura*, vel *Dasyornis* Of *Sph colluriceps* I have recently obtained two fine specimens, and Mr Jerdon has procured additional examples of *Sph striata* These birds frequent the densest grass-jungle, and Mr Frith has well suggested to me that the remarkable firm and elastic ant-orbital bristles are designed to protect the eyes when the bird is pushing its way through the grass stems This intent is, indeed, obvious enough when once suggested

No 95 This, with some allied species, now constitutes my genus *Cyornis* of which I know four Indian representatives, viz *C rubeculoides* *C banyumas* *C Tickelliæ*[*], nobis (*Muscicapa hyacintha* apud Tickell) and *C unicolor*, nobis

No 97 Add *Muscicapa bilineata*, Lesson, to the synonyms of this species

No 98 is, I now think the true *Saxicola rubicola*, and no 99 also occurs in this neighbourhood

No 99 *a* A splendid living specimen of *Orocetes cinclorhyncha* was brought to me, and kept some time in a cage, when the carelessness of a servant suffered it to escape It was impossible to look at this beautiful bird alive without being convinced of its close affinity to the Stone-chats, and not to the *Petrocinclæ*, and with the Saxicoline birds it must be arranged In this neighbourhood it seems to be a rare and accidental bird

No 101 Respecting *Muscipeta paradisi*, I have to observe that both sexes are rufous with short tails and merely an indication of the black hood in nestling plumage, that during the following year both sexes continue rufous with the crested black hood the male being already distinguished by its lengthened middle tail feathers, that after this the males I think generally, but the females not until a later period assume the white dress, wherein the sexes are still distinguished by the difference of tail I am informed that the males breed in the rufous plumage, and I have repeatedly seen a white male paired with a rufous female white females are indeed rare, and I possess one specimen of this sex with rufous upper parts and white under parts, which however is not moulting, but had thrown out this parti coloured plumage at its last change a similar parti coloured male is figured by Mr Jerdon in the first number of his 'Illustrations of Indian Ornithology published a few weeks ago

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[*] I have described this species as *C Tickelliæ*, but I now suspect that the *Muscicapa rubecula*, Sw (Nat Libr, *Flycatchers*), is the female of this one rather than of *C banyumas*, in which case the name *rubecula* must be retained for it

No 104 I have procured but one more example of *Cryptolopha poiocephala*

No 109 *Graucalus papuensis* of India generally and the Malay countries (*Ceblepyris javensis*, Horsfield, and *Gr nipalensis*, Hodgson) certainly appears to accord with Latham's description of the *Papuan Crow* excepting that the loral region is not black, but merely of a darker ash colour than the rest Length about 12 inches, of wing 6¼ to 6½ in, and of tail 5 to 5½ in Although in the few cases which I have examined, the females have been distinguished by having the under-parts transverseely striated from the throat, yet I have received two or three skins marked as female which had the lower parts as in the male Of several specimens before me, none equals the dimensions of those assigned by Mr Hodgson, though I have received specimens from him marked as *nipalensis*, which were perfectly identical in species with those of Bengal, Southern India, &c

No 111 *Lalage Sykesi*, as described by Mr Strickland, is the adult male of the species referred by Mr Jerdon and myself after Col Sykes to *Ceblepyris fimbriatus* * No 110 should also probably be placed as a *Lalage* but the divisions of this group do not appear to be generally well defined

No 112 Mr Strickland is right in his identification of this shrike, which is also the *L phœnicurus* of India apud Latham and his *L lucionensis*, *L melanotis*, Valenciennes *L ferrugiceps*, Hodgson, and it is further noticed by Latham as the "*Curcutia*, said to be found about Calcutta making a harsh noise," as mentioned in his account of *L rufus* Mr Swainson erroneously refers the *L erythronotus*, Vigors, to *L superciliosus* The latter is described to inhabit Java as well as India, and Raffles includes it in his catalogue of Sumatran birds, I have also received it from Singapore where, however, another species with analogous plumage, appears to be more common, the *L magnirostris* of Lesson (Bel Voy ), v *L strigatus* Eyton †

Two other species are met with in this vicinity, the *L antiguanus*,

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* If my *Lalage Sykesi* be the male of the *Ceblepyris fimbriatus* of Sykes, Jerdon and Blyth, the latter name must be incorrectly used In my specimens of what I consider the true *C fimbriatus* of Temminck, the wing is 4 inches 8 lines long, while in *L Sykesi* it is 4 inches 1 line Moreover my *C fimbriatus* has the *rump-feathers spiny*, proving it to be a true *Campephaga*, while in *L Sykesi* they are *soft*, which was my chief reason for placing it in the genus *Lalage* —H L S

† I formerly supposed with Mr Blyth that the *Lanius lucionensis*, Linn, from the Philippine Islands, the *L superciliosus*, Lath, from the Malay countries, and the *L cristatus*, Linn from Bengal, were one and the same, but having now obtained specimens from all these countries, I find that these form three distinct though closely allied species *L lucionensis* has the front gray, passing into grayish brown on the crown and rich rufous brown on the back and tail, *L superciliosus* has the front white, the crown and upper parts rufous, and is I presume the *L magnirostris* of Bélanger, but I cannot at the moment refer to his work, *L cristatus* has the whole front and upper parts rufous, and a smaller beak than the other two, it must I suppose be called *melanotis*, the name *cristatus* being "likely to propagate an important error"—H L S

Latham (v *nigriceps*, Franklin, v *tricolor*, Hodgson, and *Indian Shrike*, Latham), and *L tephronotus*, Vigors (v *nipalensis*, Hodgson, and *Grey backed Shrike* of Latham)

No 115 This is *Ocypterus leucorhynchos* of Mr Jerdon's catalogue and also the Assamese *leucorhynchos* of Messrs M Clelland and Horsfield

No 116 *Chibia hottentotta*, v *Cometes krishna*, the former specific name, according to Mr Strickland being 'expressive of its black plumage," the Hottentots, however are not a black race, and the name (of which Mr Martin failed to learn the derivation) is evidently a corruption of *heiden-staat*, the Dutch equivalent for 'heathen state*' *Corvus hottentottus* is also stated to have been observed by Thunberg in Caffraria which, if true, indicates another meaning for the specific name, but the description certainly applies to the young of the Indian species

With respect to the other Indian Drongos there is no difficulty about the birds themselves, but only as regards their synonymy I have endeavoured to reduce this in J A S B xi 799 *et seq*, to which I have subsequently added, that *D aeratus*, Stephens, is identical with *æneus*, and that I have received the true *balicassius* from Mr Hodgson as his *annectens* But I had not Latham s work to refer to at the time of preparing the *synopsis* of the birds alluded to, and now that it is before me I will endeavour to advance another step towards their complete determination

The name *Edolius* I limit to those species which have prolonged stems to their outer rectrices, whereof the twirled extremities are barbed only on the outer side†, the *Bhringa* (subsequently *Melisseus*) *tectirostris* of Hodgson, founded on *E remifer*, auct, differs considerably from the others, and has the extremities of its outer rectrices barbed on both sides and not twirled I now think that there are as many as four species of these restricted *Edolii* for a Singapore specimen without any crest which I saw lately in the possession of a friend, and which is doubtless Gould s *rangoonensis*, appeared to differ from that with a slight frontal crest which I described in J A S B xi 172 and of which I figured the bill and forehead in the plate annexed to p 802 of the same volume but on sending for my friend's specimen to compare it with that in the museum, I regret to learn that he has shipped it for France The following appears to me to be the synonymy of the species

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* Such at least is the opinion of a friend, tolerably well versed in philology, but another friend of mine, who is familiar with the Dutch language, will not admit it, and referring to the 'Encyclopædia Britannica,' I find it remarked, that "The natives of this country are called *Hottentots*, in their own language, a word of which it is vain to inquire the meaning, since the language of this country can scarce be learned by any other nation "

† This is not quite correct, the long webs are on the *inner*, not the *outer* side Moreover *both* sides of these feathers are furnished with webs, though the external ones are very short These species should therefore be placed in the same genus as *Bhringa remifer* and as Cuvier's name *Edolius* cannot be retained (being a mere synonym of *Dicrurus*, Vieill ), the term *Bhringa* should be extended to all these *racket tailed Dicrurinæ* —H E S

1 *E grandis,* Gould, *malabaricus,* Shaw and Stephens, and *as figured* by Latham doubtless from Lady Impey's drawing described by him, *malabaroides,* Hodgson, and perhaps, rather than the next, the *Cuculus paradiseus* Linn Nepal, Tenasserim

2 *E paradiseus* ? (Linn), *retifer,* Tem, *platurus* Vieillot, *malabaricus,* Gould, *cristatellus* nobis, Assamese *grandis,* apud Horsfield as identified from Dr M'Clelland's drawing of the specimen Bengal, Southern India, Tenasserim From Nepal I have only seen the preceding species*

3 *E rangoonensis,* apud nos Tenasserim

4 *E rangoonensis,* Gould, perhaps the *Malabar Shrike* or *Drongo* of Sonnerat and Buffon, but a crestless species remains to be verified as inhabiting Southern India Rangoon Singapore

Of *Bhringa* (subsequently *Melisseus*) Hodgson, I know only—

*Bhr remifer* (Tem), *tectirostris,* Hodgson, Assamese *rangoonensis* (?), apud Horsfield Himalaya, Assam

Next to this might be placed the *Chaptia* (since *Prepopterus*), Hodgson, founded on—

*Ch æneus* (Vieillot) *auratus* Stephens, *muscipetoides* Hodgson *Butchanga* of the Bengalees, a name which Mr Hodgson assigns to the Bengal *Fingah Bronzed Shrike* of Latham India generally

There now remain the restricted *Dicruri* of which I am well acquainted with four Indian species.

1 *D balicassius* (Linn), Javanese *forficatus* (?), apud Horsfield *annectens,* Hodgson Bill more crow-like than in the others, and tail much less deeply forked Malay countries Nepal

2 *D indicus,* Stephens, *albirictus* Hodgson, figured by him in As Res xviii pl 2, *Fingah* of the Bengalees Indian *balicassius* auctorum the beak of this species is much more shrike-like than in the others India generally, being everywhere the most common species†

3 *D macrocercus* Vieillot, *biloba* Licht (if these names should not be rather referred to the preceding species, both having the tail equally forked in fine specimens, perhaps also *cineraceus,* Horsfield, of Java, and *leucophæus,* Vieillot, of Ceylon, founded on the *Drongri* of Levaillant, as very ashy specimens are not unfrequent), *Neel Fingah* of the Bengalees About the same size as the preceding,

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* The *Cuculus paradiseus* of Linnæus is founded on a description by Brisson of a bird from Siam with a *short crest,* measuring, according to Brisson's figure, *one inch* from its extremity to the base of the beak There is therefore no doubt that this is the *cristatellus* of Mr Blyth I should rather doubt the distinctness of the *rangoonensis* of Mr Gould from that of Mr Blyth they may perhaps be different ages of the same bird —H E S

† Mr Blyth's second species is certainly the *Drongolon* of Levaillant, the basis of *macrocercus,* Vieillot, *bilobus,* Licht, and *indicus,* Steph, and Vieillot's specific name must be used for it Mr Blyth's third species is not *cineraceus* of Dr Horsfield (as that bird is uniform pale cinereous), and it is probably not the *leucophæus,* Vieill (*ceylonensis,* Steph, *cinereus,* Swains), as that is described as wholly silvery gray, and is therefore probably the same as *cineraceus,* Horsf Should this be so, Mr Blyth's third species will require a new specific name —H E S

but readily distinguished from it by the ashy tinge of its plumage, especially on the under-parts, which have never much dark gloss, and often scarcely a trace of it (whereas in the two preceding the gloss is very nearly as bright below as above); likewise by the shape of the beak, which is much less shrike-like, being less strongly and abruptly hooked at tip, also much less compressed, with the ridge of the upper mandible distinctly angulated, instead of being obtusely rounded; and the tarsi are shorter, scarcely exceeding five eighths of an inch. Irides bright brownish red. Inhabits Bengal, Nepal and Southern India.

4. *D. cærulescens*, apud Jerdon and of myself, *ante*. This is the true *Lanius cærulescens* of Linnæus, founded on pl. 56 of Edwards's birds.* Distinguished from the last species by its inferior size, and by always having the belly, vent and lower tail coverts pure white, not merely tipped with white as in the immature plumage of the rest. Structure and colouring in other respects precisely as in the last species, and irides also the same. Length of wing 4¾ to 5 inches; of middle tail feathers 4 in., and outermost (in a particularly fine specimen) 1½ in. more, being generally less. I have only obtained two specimens of this bird here, but have received it from Bengal and Central India, and Mr. Jerdon meets with it in the south. It is obviously distinct as a species.

Of these four *Dicruri* I have forwarded specimens to the India-house. The *D. leucogaster*, Vieillot, vel *albiventris*, Stephens (a name that would apply excellently to no. 4), founded on the *Drongri à ventre blanc* of Levaillant, said to have "all the under-parts from chin to vent white" and to inhabit Batavia, requires, I think, verification; and *D. viridescens*, Gould, is a good species, inhabiting the Indo Chinese and probably the Malay countries.

No. 122. *Pycnonotus hæmorrhousa*, v. *Ixos pseudocafer*, nobis, *passim*, is also common in Arracan. I have a considerable number of Bulbuls to determine, several being evidently new; but the classification of them is far from being easy. The common Bengal species, which I have regarded as *cafer*, resembles *hæmorrhousa*, except in its larger size, in having the nape and entire breast black, and the back also darker. It measures 9½ inches by 12½ in.; wing 4 in., and tail the same or nearly so.†

No. 124. Mr. Strickland is right in supposing this to be the species figured by Gould as *Pitta brachyura*, it being the *Corvus brachyurus* var. B and var. F of Latham, and also, as I fully suspect, the *P. abdominalis*, Wagler; while the Linnæan bird I conceive to be also Latham's var. E, described from Sonnerat, *P. malaccensis*, Scopoli, &c., a common Malayan species extending northward to Arracan, and which has always a black chin. For some descriptions of *Pittæ*, vide J. A. S. B. no. 59, n. s. p. 960 *et seq.*‡

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* It is also the *Lanius fingah* of Shaw, which is founded on the same plate of Edwards.—H. E. S.

† It hence appears that the *cafer* of Bengal is identical with that of South Africa.—H. E. S.

‡ Several species of *Pitta* are here confounded.—1. The true *Corvus bra-*

No 126 The bird here referred to, *Oriolus galbula*, is, I am now satisfied, the young male *O kundoo*, as I have received specimens from Central India precisely similar in colouring which were decidedly that species The Bengal example referred to has imperfect wings and tail, or the dimensions of the former would have proved it to be distinct from *O galbula* It is still the only example of the species which I have met with here, though others have been sent me from Midnapore In a notice which I gave of the Asiatic species of this genus in J A S B two corrections are necessary, the *O acrorhynchus*, Vigors being distinct from *O chinensis* and the *O castanopterus*, nobis, being merely the second plumage of *O leucogaster* v *xanthonotus*

[To be continued]

## PROCEEDINGS OF LEARNED SOCIETIES

### LINNÆAN SOCIETY

March 5, 1844 —E Forster, Esq , V P , in the Chair

Read a paper " On *Spiranthes gemmipara* " By Charles Cardale Babington, Esq , M A , F L S , F G S &c

Two specimens of this very rare plant were first found by Mr James Drummond in or about the year 1810, near Castletown Bearhaven, in the county of Cork, " opposite the western redoubt, growing in a salt-marsh near the shore ' One of these was communicated to Sir James E Smith who published it in his ' English Flora under the name of *Neottia gemmipara*, with a description furnished by Mr Drummond Within these few years the plant has been again discovered near to, but probably not in exactly the original spot, by Dr P A Armstrong, who on the 30th of September 1843 conducted Mr Babington and Mr E Winterbottom to the station, where they saw about twelve specimens, several of which had been destroyed by cattle, and all were in rather an advanced state of flowering

From the specimens then collected Mr Babington gives a detailed description of the plant, which differs in a slight degree from that furnished to Sir J E Smith by Mr Drummond He thinks it may fairly be referred to the genus *Spiranthes* although differing from the other European species in some particulars, the most remarkable of these differences consisting in the connexion of all the sepals with

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*chyurus* of Linnæus (founded on *Turdus viridis moluccensis* of Brisson), with throat black and lower parts fulvous, from the Moluccas, 2 the "common Malayan species which has always a black chin ' is probably *P cucullata*, figured in the last Number of the ' Annals ', 3 *Pitta brachyura* of Gould, with a black beak and white throat, from the Himalaya and Bengal, and which wants a specific name, 4 a species with yellowish beak, white throat, and a white or bluish-white streak over the eye this is the *P malaccensis* (Scop ) (*superciliaris*, Wagl ), founded on Sonn ' Voy Ind pl 110, and is also the *abdominalis*, Wagl , founded on Edwards, pl 324 —H E S the two lateral petals The difference in habit is considerable in consequence of the great density of the spike, and the arrangement of the flowers in three spiral lines*

A notice of a specimen of this plant, exhibited before the Society on the 7th of February 1843 by the Rev William Hincks, F L S &c, will be found at p 462 of vol xi of this Journal

Read also a continuation of Mr Griffith s memoir, comprehending the parts relating to *Cytinus* and to *Mystropetalon*

March 19 —E Forster, Esq , V P in the Chair

Read the commencement of a " Monograph on the Class *Myriapoda*, Order *Chilopoda*, with observations on the general arrangement of the *Articulata* ' By George Newport, Esq Fellow of the Royal College of Surgeons, President of the Entomological Society &c Communicated by the Secretary

April 2 —R Brown Esq , V P in the Chair

Read a continuation of Mr Newport s " Monograph on the *Myriapoda Chilopoda*

April 16 —E Forster, Esq , V P , in the Chair

Read the conclusion of Mr Newport s " Monograph on the *Myriapoda Chilopoda*

Mr Newport commences his memoir by remarking on the smaller degree of attention which has been paid to *Myriapoda* than to any other class of *Articulata* His inability from this circumstance, satisfactorily to identify the specimens in the anatomical examination of which he was engaged, induced him to undertake a complete revision of the class, as far as the materials within his reach, and contained in the cabinets of the Rev F W Hope the British Museum the United Service Museum, that of the Zoological Society, and in the Linnean and Banksian collections in the possession of the Society, would admit

After passing in review the characters of the class and noticing the different views of authors with respect to its classification as a whole, Mr Newport enters at length into the reasons which induce him, in accordance with Leach Latreille and others and in opposition to Professor Brandt to separate the *Myriapoda* from true insects, and to place them, as a class, immediately before the *Annelida*

He details his motives for preferring, with reference to the classification of the *Invertebrata* a system founded on the skeleton and organs of locomotion, together with the nervous system to that which is usually adopted, based on the organs of nutrition Guided by these views he proposes to place the sub-kingdom *Articulata* at the head of the *Invertebrata* and (following in the steps of our distinguished countrymen Kirby and Spence) to commence with the Hexapods or true Insects, placing after these the Octopods or *Arach-*

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* In a subsequent communication Mr Babington states that he has identified the Irish plant with specimens of *Spiranthes cernua*, Rich , from North America, in the herbarium of Sir W J Hooker

*nida*, and the Decapods or *Crustacea*, to be followed by the *Myriapoda*, the *Annelida*, and the remainder of the *Articulata*

The more important objections to this mode of arrangement are considered and answered, and the author next proceeds to examine the division of the *Myriapoda* into tribes and genera, on which subject he agrees, to a considerable extent, with Professor Brandt, whose plan he has followed closely in the formation of the families, sections and genera and in the characters assigned to them, but whose division of the class into masticating and sucking *Myriapoda* he has been unable to adopt The following is a synoptic table of the genera of the whole class —

## Class MYRIAPODA, *Leach*

*Ord* 1 CHILOPODA, *Latr* —Caput latum, prominens Corporis segmenta inæqualia, singula par unicum pedum ad segmentorum latera insertorum gerentia Mandibulæ prominentes, acutæ, falciformes Organorum sexualium apertura ad extremitatem analem

*Trib* 1 Schizotarsia, *Brandt* —Antennæ pluri-articulatæ, graciles, corpore longiores Tarsi longi, pluri-articulati, inæquales Oculi compositi, prominentes, globosi

*Fam* 1 *Cermatiidæ*, Leach —Scuta dorsalia 8, singula segmenta 2 ventralia obtegentia Stigmata mediana

*Gen* 1 Cermatia, *Illig* —Oculi prominentes Caput transversum Scuta dorsalia emarginata Stomatum latera incrassata

*Trib* 2 Holotarsia, *Brandt* —Tarsi 3-articulati Caput e segmentis 2 mobilibus efformatum Antennæ corpore haud longiores, setaceæ vel filiformes, 14—60-articulatæ Oculi stemmatosi, aggregati, simplices vel nulli

*Fam* 2 *Lithobiidæ*, Newp —Scuta dorsalia 15, subquadrata, inæqualia, angulis elongatis, acutis Coxæ posteriores excavationibus ovatis

*Gen* 2 Lithobius, *Leach* —Ocelli numerosi Caput latum, depressum Labrum denticulatum

*Gen* 3 Henicops, *Newp* —Segmentum cephalicum latum, ocellorum pari unico

*Fam* 3 *Scolopendridæ*, Leach —Segmenta podophora 21 vel 23 Pedes posteriores incrassati, articulo primo vel secundo spinoso

*Gen* 4 Scolopendra, *L* —Segmentum cephalicum cordatum, imbricatum Ocellorum paria 4 Spiraculorum valvularium paria 9

*Gen* 5 Cormocephalus, *Newp* —Segmentum cephalicum posticè truncatum Spiracula valvularia

*Gen* 6 Rhombocephalus, *Newp* —Segmentum cephalicum basilareque rhomboidea Labium angustatum

*Gen* 7 Heterostoma, *Newp* —Segmentum cephalicum truncatum Dentes magni Spiracula cribriformia, in paribus 10

*Gen* 8 Scolopendropsis, *Brandt* —Segmentum cephalicum truncatum Pedum paria 23

*Gen* 9 Theatops, *Newp* —Ocelli distincti Antennæ 17-

articulatæ, subulatæ  Pedes posteriores clavati  Labium dentatum

*Gen* 10 Cryptops, *Leach* —Ocelli nulli vel absconditi  Antennæ 17-articulatæ  Labium haud denticulatum

*Fam* 4 *Geophilidæ*, Leach —Segmenta subæqualia, singula e subsegmentis 2 completis sed inæqualibus efformata  Segmentum anale pedibus brevibus styliformibus

*Subfam* 1 *Scolopendrellinæ*, Newp —Corpus breve, crassum  Antennæ 14—20-articulatæ

*Gen* 11 Scolopendrella, *Gervais* —Pedum paria 10  Antennæ moniliformes, 14—20-articulatæ

*Subfam* 2 *Geophilinæ*, Newp —Segmenta numerosa  Antennæ 14-articulatæ

*Gen* 12 Mecistocephalus, *Newp* —Segmentum cephalicum angustissimum, elongatum  Corpus attenuatum  Labium latum, integrum

*Gen* 13 Arthronomalus, *Newp* —Segmentum cephalicum subquadratum  Antennarum articuli inæquales  Labium angustum, emarginatum

*Gen* 14 Gonibregmatus *Newp* —Segmentum cephalicum cordiforme, acutum  Antennæ filiformes  Corpus lineare

*Gen* 15 Geophilus, *Leach* —Caput subtriangulare  Corpus depressum, gradatim incrassatum  Segmenta pedesque numerosi

*Ord* 2 CHILOGNATHA, *Latr* —Caput verticale, rotundatum, mandibulæ crassæ, robustæ, vel cum labio coalitæ et elongatæ, segmenta numerosa  Corporis segmenta inæqualia  Pedes superficiei ventrali affixi  Organorum sexualium aperturæ in segmenti 4ti et 7mi superficie ventrali

*Trib* 3 PENTAZONIA, *Brandt* —Corpus ovale, in globum contractile, dorso valde convexo, ventre complanato  Pedes laminis liberis mobilibus affixi

*Fam* 5 *Glomeridæ*, Leach —Corpus læve, in globum contractile  Oculi distincti

*Gen* 16 Glomeris, *Latr* —Ocelli 8, in lineâ laterali curvatâ  Segmenta 13  Pedum paria 17

*Gen* 17 Zephronia, *Gray* —Ocelli numerosi, aggregati  Antennæ 6—7-articulatæ, clavatæ  Pedum paria 21

*Gen* 18 Sphærotherium, *Brandt* —Ocelli aggregati  Antennæ 7-articulatæ, clavatæ  Pedum paria 21

*Trib* 4 MONOZONIA, *Brandt* —Corpus vermiforme, elongatum  Segmenti singuli dimidia pars anterior cylindrica, posterior lateribus dilatata, laminâ ventrali duplici coalitâ pedum paria 2 gerenti

*Fam* 6 *Polyxenidæ*, Newp —Caput arcuatum, prominens  Corpus latum  Pedes attenuati, coxis maximis  Segmentum anale fasciculis longis

*Gen* 19 Polyxenus, *Latr* —Corpus breve, squamis parvis penicillatis vestitum  Pedum paria 13

*Fam* 7 *Polydesmidæ*, Leach

*Subfam* 1 *Polydesminæ*, Newp Oculi nulli vel obscuri

*Gen* 20 Fontaria, *Gray* —Corpus convexum Segmenta imbricata, laminis lateralibus deflexis

*Gen* 21 Polydesmus, *Latr* —Corpus depressum, subconvexum, laminis lateralibus horizontalibus

*Gen* 22 Strongylosoma, *Brandt* —Corpus cylindricum Segmenta tumida, laminis lateralibus rotundatis subnullis

*Subfam* 2 *Craspedosominæ*, Newp Oculi distincti

*Gen* 23 Craspedosoma, *Leach* —Ocelli numerosi, aggregati Corpus depressum, laminis lateralibus prominentibus

*Gen* 24 Platydesmus, *Lucas* —Ocelli duo, magni, prominentes Corpus depressum, laminis lateralibus prominentibus

*Gen* 25 Cambala, *Gray* —Ocelli serie simplici curvatâ Corpus cylindricum, laminis lateralibus brevissimis, in porcam simplicem desinentibus

*Trib* 5 BIZONIA, *Newp* —Corpus subcylindricum, laminis nullis marginalibus Antennæ 7-articulatæ, clavatæ Segmenta numerosa, singula e subsegmentis 2 coalitis efformata, pedumque paria 2 gerentia

*Fam* 8 *Iulidæ*, Leach —Corpus cylindricum, laminis lateralibus nullis Segmenta e subsegmentis 2 coalitis efformata

*Subfam* 1 *Synpodopetalinæ*, Newp Pedes laminis immobilibus affixi

*Gen* 26 Platops, *Newp* —Caput parvum, complanatum vel concavum Pedes graciles, elongati Corpus pyramidale, elongatum

*Gen* 27 Julus, *L* —Caput convexum Corpus cylindricum Prothoracis latera triangularia Antennæ elongatæ

*Gen* 28 Unciger, *Brandt* —Squama inferior analis mucronata Corpus cylindricum

*Gen* 29 Spirobolus, *Brandt* —Caput convexum Ocul subtetragoni Corpus subpyramidale Prothoracis latera triangularia Antennæ breves

*Gen* 30 Spiropœus, *Brandt*

*Gen* 31 Spirocyclistus, *Brandt* —Antennæ breves Oculi elongati, triangulares Thoracis latera brevia, triangularia

*Gen* 32 Spirostreptus, *Brandt* —Antennæ breves, articulis infundibulatis Oculi transversi Prothoracis latera elongata vel dilatata

*Subfam* 2 *Lysiopetalinæ*, Newp Pedes laminis mobilibus affixi

*Gen* 33 Lysiopetalum, *Brandt* —Frons dilatata Pedes laminis liberis mobilibus affixi

*Fam* 9 *Polyzonidæ*, Newp (Ommatophora, *Brandt*) —Ocelli conspicui, fronti inter antennas in seriebus transversis inserti

*Gen* 34 Polyzonium, *Brandt* —Ocelli 6 parvi, in seriebus 2 transversis Corpus depressum

*Gen* 35 Siphonotus, *Brandt*.—Ocelli 2, in serie simplici transversâ.

*Fam* 10. *Siphonophoridæ*, Newp. (Typhlogena, *Brandt*.)—Oculi nulli.

*Gen* 36. Siphonophora, *Brandt*.—Caput conicum, elongatum. Nutritionis organa rostriformia, elongata.

The author then proceeds to treat at considerable length of the external anatomy of the *Myriapoda* commencing with the composition and mode of development of the segments and their appendages, and comparing them in these particulars with Insects. The variations in the several genera of *Myriapoda* are particularly noticed, and the principles on which their development, in its various modifications, depends, are elucidated by numerous observations on their mode of growth. The structure and development of the head are next treated of in detail in the different families and genera of the *Chilopoda*, and the organs of nutrition are especially examined with reference to their development and analogies. This branch of the subject is concluded by an appreciation of the relative value of the different parts of the skeleton in furnishing generic and specific characters.

The systematic description of the families, genera and species of the *Myriapoda Chilopoda* completes the memoir, which was accompanied by a series of drawings, illustrative of their external anatomy and generic characters.

## ZOOLOGICAL SOCIETY.

Oct. 24, 1843.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Bridges on the habits, &c. of some of the smaller species of Chilian Rodents.

'*Mus longicaudatus*, Bennett.—I found this mouse in the valley of Quillota, fourteen leagues distant from Valparaiso, in the vicinity of brooks and rivulets amongst weeds and long grass, although from its appearance I should imagine it seldom takes the water. In that part of Chile it is not rare, but it cannot be considered a common species. In the province of Colchagua I have found another species approaching *M. longicaudatus*, and more abundant, differing slightly in the length of its tail, and in being somewhat less in size. At first sight the two species are liable to be confounded. Probably this is the same species mentioned in p. 40 of the 'Zool. of the Voyage of the Beagle' by Mr. Darwin as being so numerous in the province of Concepcion.

'*Mus longipilis*—Waterh., Voy. of the Beagle,'—inhabits the provinces of Aconcagua, Valparaiso and Colchagua. Its favourite haunts are the hedges made of bushes of *Mimosa Cavenia* and *Trevoa trinervis*, also other shrubs used indiscriminately for that purpose. It is necessary to explain that the hedges of the fields of Chile are renewed every year by throwing on each side of them new layers of bushes, and that they are frequently two or three yards across, forming thus a mass of decomposing wood which gives excellent shelter for the numerous small Rodents inhabiting that country, which is so rich in this interesting group The *Mus longipilis* is without a native name to distinguish it from the other species found in Chile All the small species belonging to different families are known and called by the natives by the name of Llaucha, pronounced Yaw cha, a term in the language of the Auracanian Indians signifying a mouse and this name is current in the present day in the parts of the country occupied by the descendants of the Spaniards The general term applied to the large species is 'Ratones There is a species found near the town of Quillota, fourteen leagues distant from Valparaiso, and probably not yet known to naturalists, called 'Pericote This animal lives in common in the caves with *Octodon Cumingii*

'*Myopotamus Coypus* Auct,—*Mus Coypus* Molina —inhabits the margins of rivers and lakes in the southern provinces of Chile abounding more in the lakes than in the rivers, where the *Typha latifolia* and *Scirpus* species are plentiful to give them shelter During the time of copulation, which takes place in September and October, the Coypo makes a mournful kind of cry which somewhat resembles that of a young child I was once riding along the margins of one of the streams which enters the river Teno in the province of Colchagua, and my attention was roused by a most melancholy sound, which I fancied was from a child in the water and to my surprise I found it arose from a Coypo seated on a dead stump almost on a level with the water I could not help listening for a few minutes at the singular noise, till on a sudden, when the Coypo saw me, it disappeared under water The Coypo possesses a strong attachment for its young, and swims with them on its back till they are sufficiently large to follow the old ones in pursuit of their food The places where the Coypo most abounds in Chile are the borders of the river Maypo near Santiago, the capital of the country also in the lakes of 'Aculeo' and Quintero The natives especially the husbandmen use the skin of this animal to make tobacco-pouches

'*Octodon Cumingii* Bennett —*Sciurus Degus*, Molina —*Dendrobius Degus*, Meyen,—is the most common of all the Chile Rodents It is found in the hedges of the central provinces of Chile, and may be seen during the day but more generally in the afternoon In habits it is tame and at first sight distinguished from all other species from its activity and by its carrying the tail curved upwards like the mountain *Lagotis* or Viscacha This little animal has a very extended range I have seen it as far north as lat 28° and in south 35° and it may probably extend further but I do not remember seeing it in the provinces of Chiloe or Valdivia In the province Coquimbo where hedges do not abound, owing to the sterility of the country, it inhabits rocky situations, living amongst the loose stones on the slopes of mountains, and it is frequently found in the caves or burrows of the Chinchilla The natives employed in killing the 'Chinchillas which are not uncommon about Coquimbo and Huasco, before they commence following the burrows, which they do with crow-bars, examine the dung of the animals about the caves, and from their practical knowledge they distinguish at once if the caves are inhabited by the Chinchilla or the Octodon Nevertheless, as both animals often inhabit the same cave, they frequently after great labour find it only occupied by the Octodon From observations which my long residence in Chile has given me, I am inclined to believe that the *Octodon Cumingii* does not breed more than twice during the year, viz in spring and autumn producing from four to six young at a birth The favourite food of the Octodon is herbage near the hedges but in the winter months, when pressed by hunger, it feeds on the tender bark of *Mimosa Cavenia*, also that of *Cestrum Palqui*

"*Schizodon fuscus*—Waterh 'Proc Zool Soc for November 1841 —is found in the Valle de las Cuevas, on the eastern side of the Andes about six leagues from the slopes of the volcano of Peteroa, at an elevation of from 5—7000 feet, in S lat 35° Its favourite abode is near the mountain streams in grassy situations There are certain places in the valley completely undermined by the workings of this animal, and whilst we were riding over these districts, our horses frequently plunged almost up to their knees in the burrows Whilst rambling in search of the beautiful alpine plants I could not help feeling surprise at finding animals of this order in such a locality as those elevated valleys, which are covered with snow at least four months during the year The question is, do they on the approach of snow-storms migrate towards the verge of the Pampas, or make a provision of dried grass and roots for the winter months? I should give my opinion in favour of the latter judging from their enormous burrows, The *Schizodon fuscus* is nocturnal like *Poephagomys ater* those I procured were shot in the evening near the entrances of their caves I have seen them burrowing and throwing the sand out of their caves during the day, but the moment they hear a noise their labours cease and they retire deeper into their caves

'*Notice of the new animal allied to Octodon* —This animal is found in the vicinity of the town of Curico in the province of Colchagua, it inhabits the hedges made of dead bushes, and does not appear to burrow like many other species The present species may be known by the singular chirping or whistling noise which it makes It forms its nest in the decomposing bushes and sometimes on the surface of the ground, of dried grass and appears to live in small communities of one or two families This animal appears to be more rare than many other Rodents, as I have never been able to find it in any other locality, except the one above mentioned

"*Poephagomys ater*, F Cuvier *Mus cyanus*, Molina —The *Poephagomys ater* is undoubtedly the animal alluded to by Molina under the name *Mus cyanus*, his long description of its habits agrees in most respects with the habits of this little animal but I have never yet heard it called by the natives 'Guanque' it is generally known in Chile by the name of Cururo and Cuyerta, Guanque is the vernacular name of a species of *Dioscorea* on which the 'Cururo' subsists Molina is perfectly correct in saying that it stores up a considerable quantity of provisions, which consist of the *Dioscorea*, *Conanthera*, *Ornithogalum*, *Brodiæa*, and other bulbs and tubers which abound in the country The poorer class of inhabitants being aware of its habits, round the caves or burrows, and rob them of their store, which they eat The jaws of the Cururo are capable of extraordinary expansion and by this provision of nature it is enabled to carry bulbs and tubers of a large size to its granary

The work of this little animal would surprise a person unacquainted with its habits, I have frequently seen a considerable surface of ground completely undermined by its burrows It generally selects the slopes of hills and mountains, where bulbs are found especially in the interior parts of the country its caves are carried in a horizontal course at the depth of eight or ten inches, or rather about the depth in which they meet their food

' This little animal may be considered nocturnal seldom or ever making its appearance during the day those which I procured were obtained by waiting for them in the evening and shooting them when their head scarcely emerged from their caves

"Whilst residing in the elevated valleys of the Andes on the eastern side, I observed on the dry slopes of the mountains the labours of a Rodent (probably a species of *Ctenomys* or *Poephagomys*) different from any I had previously met with, the chief difference consisted in the mouth of the cave never being left open Its mode of burrowing is similar to *Poephagomys ater* in being near the surface but as I was unfortunately unprovided with traps, I could not obtain one

*Lagotis pallipes* Bennett — This is the mountain Viscacha, the specimen brought home by me and now in the British Museum was taken on the east side of the Andes, at an elevation of 4000 to 5000 feet, between Villavicencia and Uspallata The specimen alluded to I found soon after sunrise near Uspallata in a rocky valley I saw four of these animals feeding on the scanty herbage and at first took them to be young foxes, but my men assured me to the contrary I gave my dog in charge of one of the men so that I might approach them but, unfortunately before I got within gunshot the dog got loose It was amusing to see these animals bound over the rugged and rocky side of the mountain, swinging their beautiful brushy tail and endeavouring to regain the caves in the rock

' There is a mountain 'Viscacha' on the west side of the Andes but not having seen it I am unable to say if it be the *Lagotis pallipes* or another species of the same genus This animal avails itself of caves in the rock or situations extremely rugged where large stones lie tumbled one on another leaving spaces between them sufficiently large to admit the body of the Lagotis

' *Notice of a new species of Didelphys* —In looking over the beautiful plates of the 'Zoology of the Voyage of H M S Beagle,' I find three species of *Didelphys* figured and I feel pleasure in stating that I am acquainted with another species in Chile inhabiting the province of Colchagua It is known to the natives by the name of 'Llaca,' pronounced 'Yacu' In its appearance it resembles *D elegans* but is larger in size and possesses an extraordinary fleshy tail In 1835 whilst some men were taking down a cottage on an estate near Curico two of those beautiful little animals were found in the thatch, one was taken alive and after having it several days in my possession it by some means made its escape It appears to be rare, although from its having a native name, it might be imagined to the contrary, I frequently offered a reward to the natives to induce them to obtain another specimen, but never was able to procure one "

Nov 28 —William Yarrell, Esq Vice-President, in the Chair

The following papers were read —

Descriptions of new species of the genus *Narica*, discovered by Hugh Cuming Esq ' by M Récluz

Genre NARICA, Recluz

*Nerita* species, Chemnitz *Sigaretus* species Lamarck, genre *Vanicoro*, Quoy et Gaimard olim, *Narica* Recluz in litteris, D Orbigny (Alcide) Moll Cuba, *Merria* Gray in Beechey s Voyage

1 NARICA CIDARIS *Nar testâ orbiculato-ovatâ ventricosâ anticè dilatata superne depresso-planâ solidiusculâ lacteâ plicis longitudinalibus anticè laxioribus subregularibus lineis elevatis transversis æquidistantibus reticulatâ scabriusculâ, spirâ prominulâ semisphæricâ apice retusâ, aperturâ subrotundâ, patulâ, labio arcuato, umbilico parvo, profundo, canali oblongo, angusto et vix arcuato*

*Hab* 'From the island of Masbate, Philippines, found under stones at low water H Cuming

2 NARICA LIGATA *Nar testâ ventricoso ovatâ tenuiusculâ albâ longitudinaliter superneque tenuiter plicatâ lineis transversis elevatis intermediis minoribus ligatâ, spirâ prominenti rotundatâ radiatim plicatâ apice obtusiusculâ, aperturâ subrotunda, parvâ, umbilico pervio, spirali profundo, latiusculo, canali brevi, largo, columellâ subrectâ, medio ad basim arcuatim rotundato*

*Hab* From Catanuam province of Tayabas isle of Luzon, found under stones at low water H Cuming

3 NARICA DESHAYESIANA *Nar testâ ventricoso-globosâ, tenui, fragili subepidermide lutescente tenuissimâ exalbidâ sive albâ, læviter ac creberrime transversim striatâ, anfractibus subsenis superne rotundatis longitudinaliter argutè plicatis plicis in ultimo posticè validis remotiusculis, anticam partem versùs evanescentibus, spirâ semirotundâ, anguste plicatâ, subacutâ, aperturâ subsemilunari, umbilico magno patulo, canali semilunari ad sinistram et interne carinato externe radiatim profundè ac eleganter plicato, columellâ intus et ad basim sinuatâ*

Var β *Testâ ventricoso-ovatâ, subglobosâ, plicis obsoletis, infimo anfractu angustiore*

*Hab* ' From St Nicholas, island of Zebu, Philippines found under stones at low water and var β from Catanauan province of Tayabas, isle of Luzon, found under stones at low water H Cuming

4 NARICA PETITIANA *Nar testâ orbiculato-ovatâ seu semiglobosâ crassâ, albidâ, oblique et crebrè plicatâ, lineis elevatis transversis,*

*irregularibus, angustioribus et remotioribus reticulatâ, anfractibus depresso-rotundatis, spirâ semisphæricâ obtusatâ, posticè incumbente, radiatim plicatâ, aperturâ subrotundâ dilatatâ, labio vix arcuato, margine in senioribus externe complanato, submedio vix anguloso, umbilico parvo, canali angusto, elongato parum arcuato et angulo angusto cincto*

*Hab* ‘From the island of Masbate Philippines, found under stones at low water with *Narica cidaris*” H Cuming

Var β *Testâ tenuiore plicis angustis regulariter dispositis, lineis transversis æquidistantibus clathratâ scabriusculâ, umbilico magno, profundo spiraliter contorto, canali latiusculo profundo, falciformi*

5 Narica Cumingiana *Nar testâ semiglobosâ ventricosâ tenuiusculâ exalbidâ, transversim regulariter sulcata, longitudinaliter ac obliquè lineatâ cancellatâ scabriusculâ, ad sectiones granulatâ, spirâ prominulâ, suprà plana latere carinatâ sulcis reticulatâ et punctis valde impressâ, apice posteriori, acuto aperturâ dilatatâ semilunari, umbilico profundo coarctato canali semilunari oblongo extùs annulo acuto cincto, labio superne tenui, inferne incrassato, labro intus submarginato*

*Hab* ‘From Catbalonga island of Samar, Philippines, found in coarse sand at ten fathoms H Cuming

6 Narica plicata *Nar testâ ventricoso ovatâ subglobosâ, solidâ albâ, longitudinaliter grossè plicata lineis elevatis crebrioribus costas decussantibus circumcinctâ, anfractibus superne depresso planiusculis, spirâ prominulâ laterali subacutâ, aperturâ subrotunda, umbilico latiusculo profundo spirali, canali semilunari crenulis profundis extùs cincto, columellâ arcuatâ, basi anticè gibbosiusculâ*

*Hab* ‘From the island of Ticao, found under stones at low water H Cuming

7 Narica Gueriniana *Nar testâ orbiculato ovatâ depressâ subconoideâ subtus planâ crassâ albido-lutescente oblique costata, costis rotundatis sulcis majoribus interdum æqualibus, lineis transversis creberrimis eleganter cinctâ, spirâ semiglobosâ, obtusiusculâ, aperturâ semilunari patulâ, umbilico profundo, extùs dilatato in canalem latum semisphæricum extùs angulatum explanato, columellâ rectâ supra lineâ tenuiter impressâ instructâ*

*Hab* ‘From the island of Capul, Philippines, found under stones at low water H Cuming

8 Narica distans *Nar testa parva orbiculato conicâ, tenuiusculâ pellucidâ, albidâ, costis longitudinalibus obliquis, angustis acutis valde remotis, regulariter radiata, interstitiis sub lente tenuissimè et creberrimè striatis, spirâ exsertiusculâ, gradatâ, conico acutâ, apertura semirotundâ, umbilico dilatato profundo, canali largo semicirculari, intùs striato, extùs angulo acuto circumdato*

*Hab* “From Jacna, isle of Bohol, Philippines, found under stones at low water’ H Cuming

9 Narica rosea *Nar testâ minimâ, semiglobosâ rosea tenui,*

*striato-cancellatâ, regulariter granosâ, anfractibus tribus, supernè depresso planiusculis, spirâ prominulâ, apice lævi, mammillatâ, rubicunda, aperturâ semirotundâ, columella rectiusculâ albida umbilico largo extus in canalem latiusculum, semiorbicularem producto, labro intùs striato*

*Hab* The Moluccas (M Hardouin Michelin)

10 NARICA GRANULOSA *Nar testa parva semiglobosâ, tenui, subpellucidâ, albâ sive albido lutescente, anfractibus superne planulatis fere gradatis transversim regulariter striato costatis, costis angustioribus oblique striatis ac cancellato granosis, spirâ prominulâ semiglobosâ acutâ, aperturâ semirotundâ vitreâ, columellâ tenui vix arcuatâ, umbilico profundo, canali latiusculo semicirculari*

Var β *Testâ albo-vitreâ hyalinâ*

*Hab* The Moluccas and New Holland

11 NARICA ORBIGNYANA *Nar testâ ovato globosâ crassiusculâ lacteâ transversim cingulata cingulis 5–6 obtusis majoribus, lineis longitudinalibus decussantibus cancellato-granosa, spirâ planissimâ ad peripheriam tricarinatâ carinis obtusis infimis majoribus, apice valde laterali acuto hyalino lævissimo, aperturâ ovato-rotundatâ, columellâ basi crassiusculâ et antice calloso-gibbâ supernè tenuissima, umbilico minimo, subclauso, canali lineari subrecto*

Coll M Récluz

*Hab* New Holland, on the coast of the island Maria

12 NARICA BLAINVILLEANA *Nar testâ ovato-globosâ antice dilatatâ striis transversis inæqualibus arata postice tenuiter plicatâ plicis antice obsoletis, spirâ parvulâ semisphæricâ regulariter plicatâ laterali, apice fuscâ, aperturâ subrotundâ, lacteâ, columellâ arcuatâ, basi et intùs subcompressâ, umbilico profundo, angusto in canalem semilunarem producto, labro rotundato intùs lævissimè striato*

*Hab* The Moluccas

13 NARICA SIGARETIFORMIS *Nar testâ globoso acutâ tenui exalbidâ pellucidâ, fragili, anfractibus 5–6 transversim subtilissimè striatis, spirâ prominenti conico acutâ, apice elongato corneo-fusco, aperturâ semirotundâ, columellâ tenuissimâ, vix rectâ, umbilico rotundato, dilatato, profundo, spirali, in canalem subsemis oblongum producto*

*Velutina Sigaretiformis*, Potier, Gal Moll Mus Douai pl 39 f 21 22, *malæ*

*Hab* New Holland

Prof Owen read the second and concluding part of his memoir on the *Dinornis* *

The arrival of the second box of specimens of the bones collected by the Rev W Williams in Poverty Bay, New Zealand, which had been placed by Dr Buckland in Mr Owen's hands had enabled him to confirm his former account of the generic characters and ordinal

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* See vol xii p 444

affinities of the apparently extinct *Dinornis*, and also to distinguish remains of five species of that genus

The bones of the foot, and especially the tarso-metatarsal bone, established three distinct species, the largest of which the author proposed to call *Dinornis giganteus*, the next in point of size he termed *Din struthioides*, and the third *Din didiformis* The common generic characters of the tarso-metatarsi of these species were first pointed out, and then their specific differences of proportion and figure The maturity of the different sized bones indicating the above species was demonstrated by reference to the long retention of immature characters in the same bone of existing *Struthionidæ*, and by the fact of a tarso-metatarsal bone of a half-grown *Dinornis giganteus* manifesting the same incomplete coalescence of its primitively distinct elements showing that the *Dinornis*, like the Ostrich had a tardy ossification of the skeleton, as compared with birds of flight The tibiæ were next described, one of these, belonging to a mature bird established a species smaller than the *Din didiformis* and which, from its similarity of stature to the great Bustard (*Otis tarda*) Prof Owen proposed to call *Dinornis otidiformis* The largest tibia belonging to the *Din giganteus*, presented the extraordinary dimensions of two feet eleven inches The shaft of a smaller tibia about two feet long when entire, was referred to the *Din struthioides*, and there were four entire tibiæ of the *Din didiformis* In the series of femora, after the description of the generic characters of the bone the specimens were pointed out which belonged to the *Dinornithes giganteus struthioides didiformis* and *otidiformis* and two other entire femora were described and their distinctive characters shown, which indicated, unequivocally in the author s opinion a fifth species of *Dinornis*, of the size of the Emeu, and which was therefore named *Din dromæoides*

Three pelves, more or less perfect and portions of two others were described and were referred to the *Din giganteus dromæoides*, and *didiformis* Three cervical and two dorsal vertebræ also indicated three distinct species of *Dinornis* and all of them presented the common character of unusual strength of the spinous and transverse processes Comparative dimensions of most of the bones exhibited were given No part of the skull sternum, ribs or wing-bones had been transmitted but Prof Owen proceeded to point out the physiological grounds for concluding that the development of the anterior extremities must have presented in the *Dinornis* an intermediate condition between that in the Emeu and that in the Apteryx

The author then gave his calculations, from the analogies of existing Struthious birds, of the height of the different species of *Dinornis* The largest *Din giganteus* according to the proportions of the Ostrich, must have stood ten feet five inches, but according to those of the [illegible]ssowary nine feet five inches, its average stature might be taken at ten feet A diagram of the great extinct bird, restored according to these proportions, was exhibited

The *Dinornis struthioides* was seven feet high, which is the average stature of the *Struthio Camelus*

The length of the tibia and metatarsus of the *Din dromæoïdes* not yet being known, the height of five feet was assigned to it as a probable one, its femur corresponds in size with that of the Emeu, whose average measurement in captivity is between five and six feet

The height of the *Din didiformis* was four feet, exceeding, therefore the extinct Dodo (*Didus ineptus*), but evidently resembling it in its stouter proportions and shorter metatarsus, as compared with the other species of *Dinornis*

Prof Owen next proceeded to consider the evidences of tridactyle birds afforded by the impressions in the New Red Sandstone of Connecticut, called 'Ornithichnites and having pointed out the proportions of the tarso metatarsal bone in existing Struthious birds to their foot prints, indicated thereby the size of the same bone in different *Ornithichnites*, and reciprocally the sizes of the foot prints of the different *Dinornithes*, from those of their tarso metatarsal bones

The two phalanges of the *Dinornis* which were described and compared in this section of the memoir afforded pretty clear indications of the form and proportions of the toes in the two species (*giganteus* and *didiformis*) to which they were referred These data showed that the trifid foot-print of the *Dinornis giganteus* must have exceeded in size the *Ornithichnites giganteus* and *O ingens* of Prof Hitchcock, and that the *Din didiformis* must have left impressions as large as those called *Ornithichnites tuberosus* The author warned his hearers against inferring identity of species or even genus between the extinct *Struthionidæ* of the alluvium of New Zealand and those of the trias of North America, on account of correspondence of size and number of toes which the modern genera *Casuarius*, *Rhea* &c proved to be insufficient grounds He concluded by a comparative review of recent and extinct *Struthionidæ* remarking on their peculiar geographical distribution on the conditions which favoured the former existence of so rich a development of the family in New Zealand, and on the probable causes of their extermination Evidence of the recent character of the bones described was afforded by the great proportion of animal matter which they retained, and the details of the analysis of the earthy salts were promised for a future Meeting

December 12 —William Yarrell, Esq , V P in the Chair

Mr Gould laid before the Meeting an extensive series of Toucans, and called attention to two species which had not hitherto been characterized, viz —

RAMPHASTOS CITREOLÆMUS *Ramp rostro nigro vitta latá basali et culmine olivaceo viridibus hóc colore gradatim cum flavido apud apicem mandibulæ utriusque se commiscente, ptilose nigra, gulá alba, pectore sulphureo, vittá splendidè coccineá cincto, tectricibus caudæ superioribus sulphureis*

Bill black, with a very broad basal band, and the culmen of an olive-green, passing into pale yellow on the points of both mandibles, and deepening into orange at the gape, the ridge round the base of the bill black, crown of the head, back of the neck, all the upper surface, wings, tail, breast, abdomen and thighs deep black, throat white chest sulphur-yellow, bounded below by a band of rich deep scarlet, upper tail-coverts sulphur-yellow, under tail-coverts rich deep scarlet

Total length, 21 inches, bill, 5½, wing, 8¼, tail, 7½, tarsi, 1¾

*Hab*' Santa Fe de Bogota

In the collection of Prince Massena at Paris and in my own.

PTEROGLOSSUS PŒCILOSTERNUS *Pt culmine rostri, strigá angusta ad basim mandibulæ superioris, sic et mandibulá inferiore totá nigerrimis, mandibulis utrisque ad basim lineá prominente angusta aurantiacá circumdatis, mandibulæ superioris lateribus belle aurantiacis, capite et gulá splendidè nigerrimis, dorso, alis caudáque saturatè viridi-olivaceis, corpore inferiore sulphureo, vittá pectorali nigrá alterá sanguineá*

Culmen, a narrow band down the base of the upper mandible and the whole of the under mandible deep black narrow elevated ridge surrounding the base of both mandibles orange sides of the upper mandible beautiful orange fading into white towards the tip which is stained with red, head and throat deep glossy black back wings and tail dark olive-green, rump and upper tail-coverts rich deep blood red, all the under surface sulphur yellow, crossed on the chest by an irregular band of black and on the breast by another of deep blood red the interspaces stained with scarlet, thighs chestnut, each feather slightly fringed with sulphur-yellow

Total length, 18 inches, bill, 4¼, wing, 6, tail, 7¼ tarsi, 1⅜

*Hab* Santa Fe de Bogota

In the collection of Prince Massena at Paris

Professor Owen read a communication on the Rudimental Marsupial Bones in the *Thylacinus* —

The marsupial bones, as bones, do not exist in the Dog headed Opossum or Hyæna of the Tasmanian Colonists (*Thylacinus Harrisii* Temm), they are represented by two small, oblong flattened fibro-cartilages imbedded in the internal pillars of the abdominal rings, and appear each as a thickened part of the tendon of the external oblique abdominal muscle which forms the above pillar The length of the marsupial fibro cartilage is six lines its breadth from three to four lines, its thickness one line and a half

This was the condition of the rudimental marsupial bones in two full grown females and one male specimen of the *Thylacinus* in a fourth large and old male a few particles of the bone-salts were deposited in the centre of the fibro cartilage, occasioning a gritty feeling when cut across by the knife

This unexpected and very remarkable modification of the most characteristic part of the skeleton of the Marsupialia, in one of the largest of that order, has many important bearings upon the physiology of the problematical 'ossa marsupialia' They have been most commonly supposed to serve for the support of the marsupial pouch and young, but this pouch is well developed in the female Thylacine and in one of the specimens which I dissected four well developed teats, each two inches long, indicated that it had contained four young ones when, or shortly before, it was killed The existence of the marsupial bones in the male as well as the female sex in other marsupial animals had already invalidated the above physiological explanation, and it equally opposes the idea of the use of the marsupial bones, propounded by M de Blainville —that they aid in the compression required to expel the embryo Besides, it is not in the females of those animals which give birth to the smallest young that we should expect to find auxiliary bones for increasing the power of the muscles concerned in parturition My view of the uses of the marsupial bones as explained in the 'Philosophical Transactions' for 1834 is, that they relate more immediately to an increase of power in the muscles (*cremasteres*) which wind round them, than of those implanted in them and to the extent to which the cartilaginous representatives of the ossa marsupialia in the Thylacine strengthen the pillars of the abdominal ring, they must increase the contractile force of the compressors of the mammary glands and teats which are situated and surrounded by the cremasteres in the Thylacine, as in other Marsupialia Nevertheless the almost obsolete condition of the ossa marsupialia in the Thylacine, and their very various relative sizes in other Marsupialia are circumstances which seem incompatible with the same kind and degree of use in all the species they are very slender and not above half an inch in length in the *Myrmecobius* whilst in the Koala they nearly equal the iliac bones in size The so-called pyramidales muscles which derive a great proportion of their origin from the ossa marsupialia, bear a direct ratio to those bones in size, and an attentive observation of the habits and modes of locomotion of the different marsupial species is still wanting for a complete elucidation of the function of the marsupial bones It is important to the palæontologist that the cartilaginous condition of the marsupial bones in the Thylacine should be borne in mind in regard to the evidences of the marsupial order that may be yielded by fossil remains the fossil pelvis of the Thylacine for example had that species been long ago as it soon is likely to be, extinct, would never have afforded the triumphant evidence to which Cuvier appealed in demonstration of the *Didelphys* of the gypsum quarries at Montmartre yet the Thylacine would not therefore have been less essentially a marsupial animal This may teach us to pause before drawing a conclusion against the marsupial character of the small Stonesfield mammalia, if their pelves should ever be found without trace of the ossa marsupialia

"Descriptions of new Shells collected during the voyage of the Sulphur, and in Mr Cuming's late visit to the Philippines,' by Mr Hinds

Abstract of the accompanying descriptions of shells —

The number of well authenticated species of *Terebra* hitherto on record is about sixty In the present paper exactly fifty more are added, all of which are presumed to have been hitherto unrecorded Of this number sixteen are from the Indian seas six are from the African seas, twelve are from the American seas, and five are from the Pacific, and the whole, without exception, from within the Tropics The localities of eleven are unknown

They most usually occur under a small incumbent pressure generally at a depth of from five to eighteen fathoms Some are found about low water and with much constancy they affect situations where the floor of the ocean is composed of sandy mud

### TEREBRA, Bruguière

TEREBRA ROBUSTA *Ter testâ turrito subulatâ, solidâ, ponderosa, albida flammeis longitudinalibus interrupte pictâ, anfractibus inferioribus rotundatis indivisis, lævigatis, superioribus versus extremitatem spiræ subplanulatis unocinguliferis longitrorsum plicatis, anfractu ultimo rotundato triseriatim picto ad basin coarctato, aperturâ elongatâ, columellâ arcuata subcallosâ, epidermide luteo-fuscâ, operculo parvo crasso* Axis 57 lin

*Hab* West coast of America, between 8° 57′ and 21° 32′ north latitude, namely at Panama Gulf of Nicoya, Gulf of Papagayo, and San Blas in from four to eighteen fathoms, sandy mud

Cab Belcher and Cuming

TEREBRA SUCCINEA *Ter testâ subulata acuminatâ succineâ lævigata, anfractibus planulatis linea impressâ divisis, longitrorsum plicis obsoletis vel lineis arcuatis incrementi minutis transversim infrà lineam impressam, leviter striatis, area subconcavi, punctis parvis fuscis distantibus biseriatim cincta versus margines tuberculato incrassatâ* Axis 54 lin

*Hab* ——?

Cab Cuming

Two specimens of this elegant species are in the above collection without any history attached to them, they have evidently been highly cleaned, but retain the appearance of having been once covered by an epidermis

TEREBRA CONSORS *Ter testâ gradatim subulatâ lævigatâ polita albida, flammeis pallidis fuscis ornatâ, anfractibus subplanulatis superne lineâ impressâ divisis, areâ superiore spiræ leviter tuberculatâ, anfractu ultimo prope basin fasciato, apertura infernè subeffusa, columellâ breviusculâ* Axis 31 lin

*Hab* Tahiti, Society Islands

Cab Cuming

Its nearest ally is *T dimidiata* than which it is far more gradually subulate the upper area of the divided whorl is raised and somewhat rounded, the white is the base colour of the shell, and the last whorl is distinctly banded

TEREBRA SPECTABILIS *Ter testâ subulatâ, lævigatâ, polita, anfractibus superne sulco impresso divisis, infrà longitrorsum plicatis interstitiis lævigatis medio saturatè castaneis, infernè albis, cingulo tuberculato, albido, anfractu ultimo fasciato, columellâ elongata* Axis 13½ lin

*Hab* Guinea, on the sands Humphrey Sumatra, on the sands Ellis

Cab Cuming

**Terebra bicincta** *Ter testâ subulata, lævigatâ, nitidâ, anfractibus rotundatis, indivisis, longitrorsum plicatis supernè areâ coarctata, transversim biseriatim super plicas minutè tuberculatis, plicis tenuibus acutis, interstitiis lævigatis, anfractu ultimo concolore*
Axis $12\frac{1}{2}$ lin
*Hab* ——?
Cab Cuming Unique
Remarkably and very distinctly characterized by the two rows of small tubercles which encircle the whorls The shell is otherwise of an uniform white glassy colour, which might be attributable to its condition

**Terebra fatua** *Ter testa turrito subulatâ albidâ lævigata, polita, anfractibus subplanulatis superioribus lineâ impressa cinctis maculis fuscis pallidis distantibus biseriatim ornatis, spirâ obsolete plicatâ, anfractu ultimo elongato, maculis exceptis, unicolore*
Axis 34 lin
*Hab* St Christopher, West Indies, on the sand Mr Miller 1799
Cab Cuming

**Terebra nimbosa** *Ter testâ elongatè conico subulata acuminatâ lactea strigis longitudinalibus nubeculatâ, anfractibus planulatis, lævigatis politis integris inferne prope suturam alba, angustè fasciata ultimo fasciato, columella lævi truncata* Axis 25 lin
*Hab* ——?
Cab Cuming

**Terebra copula** *Ter testâ elongate turrito-subulata acuminata, lævigata nitidâ saturate castanea, anfractibus subrotundatis superne cingulo tuberculato cinctis infrà plico costatis, cingulo atro castaneo fasciato rarò intervallis tantùm maculato interstitiis lævigatis, anfractu ultimo parvo rotundato, propè basin duabus fasciis albis angustis ornato* Axis 17 lin
*Hab* Guinea on the sands Humphrey
Cab Cuming

**Terebra alveolata** *Ter testâ turrito subulatâ attenuate acuminata nitidâ fuscâ, anfractibus subplanulatis supernè cingulo tuberculato cinctis infra plico costatis, interstitiis striatis, cingulo et anfractu ultimo albo fasciato maculis quadratis rufis articulato* Axis 16 lin
*Hab* Straits of Malacca in seventeen fathoms among mud
Cab Belcher
The description is drawn up from a somewhat young specimen and the mouth and last whorl have not yet attained their full development The character of the shell is however very conspicuous In this genus the last whorl will be found very frequently to offer decided features and becomes a valuable aid in the diagnosis

**Terebra pulchra** *Ter testâ turritâ conico subulata, acuminatâ nitidâ pallidâ, anfractibus subplanulatis, longitrorsum recte plicocostatis, supernè lineâ impressâ cinctis interstitiis lævigatis, anfractu ultimo pallidè lineato* Axis 11 lin

*Hab* Marquesas, in seven fathoms
Cab Belcher

Perhaps more nearly resembling *T plicata* than any other species, from which with a little care, the description will suffice to distinguish it The specimens were collected at the Marquesas group of islands which scarcely offer any particular novelty in any department of natural history and the greatest exception will be found among *Terebra*, of which it has a few peculiar species, and also some interesting varieties of other well-known kinds Indeed though the group is by no means the metropolis of the genus the species would seem to exist here under some peculiar circumstances

Terebra columellaris *Ter testâ elongatâ, subcylindraceâ tarrito subulata, aurantiacâ albo nebulosâ, anfractibus subrotundatis, longitrorsum undate plico costatis superne linea impressâ cinctis, interstitiis rufis striatis, anfractu ultimo breviusculo rotundato, albo fasciato* Axis 19 lin
*Hab* ——?
Cab Cuming

Remarkable from its great similarity to *T undulata*, which is itself a peculiar species The grounds of distinction are its decidedly cylindrical shape different distribution of the colour and its short, abrupt rounded and banded last whorl

Terebra nitida *Ter testâ obeso-subulatâ acuminatâ pallide plumbeâ polita, anfractibus subplanulatis recte plico costatis, supernè interstitiis linea punctatâ cinctis ultimo parvo subattenuato, unicolore, plicis evanidis, labio interno producto, labro antice subsinuoso* Axis 10 lin
*Hab* Marquesas, in seven fathoms, sandy mud
Cab Belcher

An excellent diagnostic character exists in this species in the circumstance that the girdling line which traverses the upper part of each whorl does not cross the ribs, but is confined to the interstices

Terebra varicosa *Ter testâ elongatâ conico-subulatâ, acuminata nitidâ, anfractibus subplanulatis plico-costatis, superne cingulo tuberculato contractato cinctis, costis subdistantibus albidis interstitiis striatis fuscis, anfractu ultimo breviusculo, rotundato, albo fasciato, columellâ contortâ* Axis 11 lin
*Hab* Gulf of Papagayo, west coast of Central America, in twenty-three fathoms mud
Cab Belcher

Terebra laurina *Ter testa elongatè subulatâ, acuminatâ, lævigatâ, polita, olivaceâ, anfractibus planulatis plicis tenuibus sinuosis, capillaribus, infrà evanidis superne lineâ impressâ obsoletâ cinctis, ultimo unicolore, lævigato, aperturâ fuscâ, columellâ lævi, subtruncatâ* Axis 32 lin
*Hab* Western Africa, in sandy mud Rev W V Hennah
Cab Cuming
The impressed line is always faint and sometimes not at all visible

The specimens are nearly of an uniform colour, but a band of some what deeper colour traverses the upper portion of each whorl

TEREBRA STYLATA *Ter testâ subulatâ, acuminatâ, politâ olivaceâ, anfractibus subplanulatis, integris, numerose plicatis, infrà evanidis, prope suturam albidis maculis fuscis interrupte fasciatis ultimo lævigato inferne albo angustè fasciato, aperturâ fuscâ, columellâ lævi, subtruncatâ* Axis 21 lin

*Hab* Japan, Philippine Islands

Cab Cuming

TEREBRA TUBEROSA *Ter testâ turrito-subulata saturate fulva nitida, anfractibus rotundatis longitrorsum costatis supernè cingulo numerose tuberculato, costis brevibus, nodulosis striis decussantibus, columellâ contortâ* Axis 11 lin

*Hab* Ticao Philippines

Cab Cuming Unique

In this characteristic species the girdle consists of a number of small tubercles superior in number to the vertical ribs

TEREBRA CONSPERSA *Ter testâ turrito-subulatâ, nitida albâ, anfractibus subrotundatis plico-costatis supernè lineâ impressâ, præcipue interstitiali cinctis prope suturam punctis rufis rarò conspersis interstitiis striatis, anfractu ultimo ad basin fulvo* Axis 10 lin

*Hab* Catbalongi, island of Samar, Philippines, eight fathoms, sandy mud

Cab Cuming

A pretty little species only known to me through the two specimens in the above collection, and it will readily be distinguished by its sparsely scattered rufous spots and orange base

TEREBRA LINGUALIS *Ter testa turrito subulatâ, albidâ flammeis atro fuscis longitudinalibus ornatâ, anfractibus planulatis duabus lineis impressis divisis infrà suturam tuberculatis areâ inferiore lævigatâ, anfractu ultimo subrotundato lævigato fasciato, apertura quadrata, columella contortâ* Axis 30 lin

*Hab* Gulf of Papagayo Bay of Montejo, west coast of America ten to seventeen fathoms sandy mud

Cab Belcher and Cuming

The whorls, particularly those of the spire are divided into three spaces by two girdling lines, the lower area is smooth but the two others, particularly the most superior, is tubercled It is a handsome species, from the deep reddish-brown flames with which it is covered

TEREBRA LIGATA *Ter testa elongate subulatâ, acuminatâ, anfractibus planulatis, transversim striatis cingulis duobus tuberculatis, cingulo superiore et areâ inferiore maculis quadratis fuscis transversis ornatâ cingulo inferiore minore albida concolore, anfractu ultimo parvo, biseriatim maculato* Axis 15½ lin

*Hab* Marquesas, in seven fathoms, sandy mud

Cab Belcher

TEREBRA FUNICULATA *Ter testâ elongatè subulatâ, nitidâ, fulvâ,* *anfractibus numerosis, planulatis supernè cingulo lævi lineâ impressa diviso, infrà cingulo minore, areâ inferiore transversim striata, anfractu ultimo brevi, medio sulco unico, aperturâ parva, concolore, labio interno subcalloso, producto* Axis 23 lin

*Hab* ——?

Cab Belcher and Cuming

TEREBRA FENESTRATA *Ter testâ elongatè conico-subulatâ, pallide fulva, anfractibus planulatis supernè cingulo nodulifero infrà secundo minore, infernè cancellatis, apice subpapillari, anfractu ultimo quadrato ad basin abruptè contractato, aperturâ parvâ, labio interno subcalloso producto* Axis 15 lin

*Hab* San Nicholas, island of Zebu, Philippines sandy mud at low water

Cab Cuming

TEREBRA EBURNEA *Ter testâ obeso subulatâ, alba anfractibus lævigatis nitidis, superne linea impressa inferne uni vel biseriatim lineis punctatis cinctis, anfractu ultimo quinis seriebus linearum punctarum, aperturâ elongata, columella lævi breviuscula* Axis 16 lin

*Hab* Seychelles

Cab Belcher Unique

TEREBRA AMANDA *Ter testâ elongatâ conico subulata nitidâ, anfractibus planulatis supernè cingulo tuberculato margaritaceo cinctis infrà secundo minore concolore inferne aurantiacis biseriatim punctato-lineatis, ultimo brevi, columellâ contortâ* Axis 11 lin

*Hab* Straits of Macassar in eleven fathoms coarse sand

Cab Belcher

An uncommonly pretty shell offering an elegant contrast between the row of pearly tubercles and the general orange colour

TEREBRA VIOLASCENS *Ter testâ turritâ cylindraceo subulatâ violaceâ, anfractibus rotundatis longitrorsum oblique plico costatis superne linea impressâ obsolete cinctis, costis subconfertis interstitiis crebre striatis, apertura parva, elongata, labio interno producto* Axis 15 lin

*Hab* New Guinea in seven fathoms mud San Nicholas Zebu and Mindanao, Philippines, in twenty to thirty fathoms

Cab Belcher and Cuming

The Philippine specimens are of a different colour and disposed to be banded, but they have the appearance of dead shells The species is very like an American fossil from Alabama, *T venusta* Lea

TEREBRA ARMILLATA *Ter testa turrito-subulata, acuminata fuscâ, anfractibus planulatis longitrorsum subdistanter plico-costatis, transversim lineis definitis impressis, supernè cingulo noduloso, ætate valdè notabili, anfractu ultimo subquadrato, ad basin albo fasciato, aperturâ atro-fusca, columellâ contorta* Axis 22 lin

*Hab* Abundant in various localities on the west coast of America between Panama and the Bay of Magdalena in Lower California, in from five to thirteen fathoms, also at the Galapagos, in ten fathoms chiefly in sandy situations It was also found imbedded in the fossiliferous cliffs which surround a portion of the Bay of Magdalena

Cab Belcher and Cuming

TEREBRA ASPERA *Ter testá turrito-subulatá acuminatá, pallidá, aurantiacá vel fuscá, anfractibus subrotundatis longitrorsum subconfertè plico-costatis nodulosis liris transversis decussantibus, supernè cingulo plico-nodulifero sparsim fusco maculato, anfractu ultimo rotundato ad basin albo fasciato, apertura colorem testæ simulante, columella plicatá* Axis 23 lin

*Hab* Panama Monte Christi St Elena, west coast of America, in from six to ten fathoms, sandy mud

Cab Cuming

TEREBRA TUBERCULOSA *Ter testá turrito subulatá acuminatá, olivaceá, anfractibus planulatis lævigatis, politis, supernè cingulo tuberculato area inferiore triseriatim tuberculato, seriebus duabus superioribus frequenter subevanidis, anfractu ultimo subquadrato, unicolore multiseriatim tuberculato, columellá contorta* Axis 24 lin

*Hab* Panama, Gulf of Papagayo, and San Blas, in from four to eleven fathoms

Cab Belcher

TEREBRA SPECILLATA *Ter testá gracile turrito-subulatá valdè acuminata, alba, rufo sparsim maculatá et nebulosá, anfractibus subplanulatis longitrorsum subdistanter tenue plico-costatis, transversim leviter striatis supernè cingulo tuberculato interstitiis tuberculorum præcipue pictis, anfractu ultimo fasciato, aperturá parvá, columella subrectá* Axis 20 lin

*Hab* San Blas, from seven fathoms, sandy mud

Cab Belcher

TEREBRA INTERTINCTA *Ter testa turrito-subulatá pallidá vel cærulescente, anfractibus planulatis politis duabus vel tribus lineis transversis, supernè cingulo tuberculato, infernè obsoletè tuberculo plicatis interstitiis tuberculorum fusco maculatis, anfractu ultimo subrotundato, uniseriatim tuberculato interstitiis nebulosis, aperturá ovali* Axis 20 lin

*Hab* Gambia, among sandy mud

Cab Cuming and Saul

TEREBRA RADULA *Ter testá turrito-subulata, fulvá nitidá, anfractibus rotundatis, plicis tuberculatis longitudinalibus et transversis cancellatis, propè suturam serie tuberculorum majusculorum, anfractu ultimo ad basin albo angustè fasciato, aperturá oblonga, concolore* Axis 19 lin

*Hab* Puerto Portrero, west coast of America, in thirteen fathoms, coral sand

Cab Cuming A single specimen

TEREBRA BIFRONS *Ter testa turrito subulata lævigatá, fuscá, anfractibus rotundatis, inferioribus multiseriatim tuberculatis, su-*

*perioribus longitrorsum biseriatim tuberculo-plicatis, tuberculis parvis approximatis interstitiis lævibus, aperturâ oblongâ, columella rectiusculâ subtruncata* Axis 23 lin

*Hab* Japan, sandy mud Dr Siebold

Cab Cuming Unique

TEREBRA GLAUCA *Ter testâ turrito-subulatâ, acuminatâ, glaucescente, anfractibus rotundatis, eleganter cancellatis, propè suturam cingulo albido tuberculato, anfractu ultimo elongato, pallide fasciato, aperturâ ovali, columellâ contorta* Axis 14 lin

*Hab* —— ?

Cab Cuming Unique

TEREBRA LARVÆFORMIS *Ter testâ subcylindraceâ turrito-subulatâ fusca nitidâ anfractibus brevibus rotundatis longitrorsum plicocostatis superne lineâ impressâ contractatis, costis rotundatis vel varicosis interstitiis leviter striatis, anfractu ultimo breviusculo pallide fasciato, apertura pallidâ* Axis 23 lin

*Hab* St Elena Monte Christi west coast of America in from six to fifteen fathoms sandy mud

Cab Cuming

I have examined a number of specimens of this shell all of which I refer to this species and find them vary much in the general and relative proportion of their outline and width of whorls

TEREBRA ELATA *Ter testâ subcylindraceâ elongatâ turrito subulatâ pallide fulva, anfractibus fere planulatis, longitrorsum plicatis superne lineâ impressa cinctis plicis approximatis interstitiis striatis anfractu ultimo ad basin et propè suturam fusco, aperturâ elongatâ* Axis 12 lin

*Hab* Bay of Montijo, west coast of America, in fifteen fathoms, coarse sand

Cab Cuming

TEREBRA TEXTILIS *Ter testa turrito subulatâ pallidè luteâ, anfractibus ferè planulatis, longitrorsum plicatis, superne linea punctato-impressâ cinctis serie tuberculorum deindè excisâ albidâ, plicis approximatis interstitiis striatis, anfractu ultimo parvo unicolore, columella plicatâ, labio interno producto* Axis 11½ lin

*Hab* Sorsogon, Bay of Manila, Philippines, Straits of Macassar in from six to thirteen fathoms, sand and coarse gravel

Cab Cuming and Belcher

This Asiatic species very closely resembles the American just described, and furnishes another of those instances of affinity whilst still retaining unquestionable distinctness, which occur so frequently in the shells of the tropics of the two hemispheres; and thus whilst both are enriched by similar forms these present themselves under slight but constant differences

TEREBRA PICTA *Ter testâ subcylindraceâ, turrito-subulatâ nitidâ, pallidè aurantiacâ, atro fusco longitrorsum maculatâ vel nebulosâ, anfractibus rotundatis superne cingulo tuberculato infrà plicocostatis interstitiis striatis, anfractu ultimo fasciato, aperturâ parvâ atro fusca, columellâ subrectâ* Axis 15 lin

*Hab* San Nicholas, island of Zebu, Philippines
Cab Cuming

TEREBRA CASTA *Ter testâ turrito subulatâ, albescente, lævigatâ, politâ, anfractibus integris, planulatis supernè plicatis et lacteo fasciatis, infra lævigatis strigis longitudinalibus pallidè fuscis nebulosis, anfractu ultimo subelongato lacteo fasciato, columellâ brevi subrectâ* Axis 13 lin
*Hab* Ilo ilo, island of Panay Philippines, at low water
Cab Cuming

TEREBRA INCONSTANS *Ter testâ obeso subulatâ acuminatâ, lividâ vel pallidâ politâ, anfractibus integris subrotundatis longitrorsum plicatis interstitiis lævigatis, infra suturam et ad basin anfractûs ultimi pallidè fasciatâ, apertura effusâ, columellâ truncata subcallosâ* Axis 16 lin
*Hab* Sandwich Islands
Cab Cuming

This species has much of the general character of *T anomala* but the whorls are constantly entire, and the shells are more acuminate and obese

TEREBRA PENICILLATA *Ter testa turritâ obeso-subulatâ lævigatâ, polita albâ lineis undatis rufis longitrorsum dispositis, anfractibus integris ultimo elongato, efasciato, spira obsoletè plicatâ, aperturâ elongatâ, columellâ lævi* Axis 17 lin
*Hab* Seychelles
Cab Belcher and Cuming

TEREBRA VENOSA *Ter testâ subcylindraceo-subulatâ, lævigatâ politâ, anfractibus integris subplanulatis supernè albo infrâ purpureo cinctis strigis rufis longitudinalibus flexuosis, spirâ plicatâ anfractu ultimo subrotundato, rariùs transversim fasciato vel lineato, aperturâ elongatâ, albâ* Axis 16 lin
*Hab* ——?
Cab Cuming

The only species in this now extensive genus where the fasciation of the last whorl is not to be relied on as a character

These two species have been united by M Kiener with *T lanceata*, but I cannot help regarding them as most unquestionably distinct

TEREBRA LUCTUOSA *Ter testâ gracilè acuminatâ, lævigatâ politâ, atro fuscâ rariùs castanea vel olivaceâ, anfractibus subplanulatis, integris supernè plicis parvis undatis, infrâ evanidis ultimo elongato concolore, columellâ lævi breviusculâ* Axis 17 lin
*Hab* Gulf of Nicoya, Puerto Portrero, west coast of America, in twelve fathoms, coral sand
Cab Cuming and Belcher

TEREBRA CUSPIDATA *Ter testâ gracilè et elongatè subulatâ, valdè acuminatâ lævigatâ politâ, nitidâ, anfractibus planulatis integris, supernè plicatis infra evanidis, pallidis cæruleo anguste fasciatis, anfractu ultimo lævigato, subdiaphano, ad basin fasciâ rufa ornato* Axis 13 lin
*Hab* Cape Coast Africa Humphrey
Cab Cuming

TEREBRA MICANS *Ter testâ conico-subulatâ acuminatâ, semiopacâ, pallide fulvâ, nitidâ, anfractibus planulatis integris longitrorsum plicis capillaribus superne cæruleo et ad basin anfractûs ultimi fusco fasciatis, aperturâ inferne effusâ, columellâ truncatâ* Axis 13 lin
*Hab* —— ?
Cab Cuming

The specific name I find in use as a cabinet name, but I am ignorant who is the originator

TEREBRA LEPIDA *Ter testâ obeso- vel rarius subcylindraceo-subulatâ, acuminatâ lævigatâ, politâ albidâ vel pallide fulvâ, anfractibus planulatis, integris plicis longitudinalibus acutis, interstitiis lævigatis superne maculis rufis cinctis, anfractu ultimo subcylindraceo pallide fasciato* Axis 10 lin
*Hab* Guinea, on the sands Humphrey
Cab Cuming

TEREBRA OBESA *Ter testâ obeso subulatâ lævigatâ albidâ maculis fuscis longitudinalibus pallide ornatâ, anfractibus paucis, subrotundatis, integris, ultimo biseriatim maculato, spirâ obsolete plicatâ, aperturâ oblongâ, columellâ truncatâ* Axis 6 lin
*Hab* —— ?
Cab Cuming Unique

In this singular little shell the last whorl occupies nearly one half of the entire length

TEREBRA NASSOIDES *Ter testâ obeso-subulatâ lævigatâ nitidâ anfractibus planulatis, integris superne albo, medio fusco cinctis ultimo unicolore, aperturâ inferne effusâ* Axis 6 lin
*Hab* —— ?
Cab Cuming

TEREBRA RUSTICA *Ter testâ obeso-subulatâ acuminatâ fuscâ, nitidâ striis transversis scabrâ, anfractibus subrotundatis longitrorsum plico-costatis, superne infra suturam luteis, plicis subdistantibus fere continuis, anfractu ultimo elongato, concolore, aperturâ elongatâ, columellâ lævi subrectâ* Axis 8 lin
*Hab* —— ?
Cab Metcalfe

TEREBRA TENERA *Ter testâ parvâ, obeso subulatâ, lævigatâ, nitidâ, anfractibus plico-costatis, pallide fulvis, superne prope suturam rufo fasciatis ultimo ad basin rufo, plicis continuis, columellâ contortâ* Axis 4 lin
*Hab* Straits of Malacca, in seventeen fathoms, Ceylon
Cab Belcher

TEREBRA MERA *Ter testâ subcylindraceo-subulatâ lævigatâ nitidâ, albidâ vel pallide rufo late fasciatâ, anfractibus subplanulatis, superne plicis parvis numerosis obliquis, infrà evanidis, aperturâ parvâ elongatâ, columellâ subtruncatâ* Axis 7½ lin
*Hab* Straits of Malacca in seventeen fathoms
Cab Belcher

TEREBRA PYGMÆA *Ter testâ purpureâ, obeso subulatâ, anfrac-*

*tibus paucis subrotundatis, longitrorsum minute plico costatis, supernè insigniter fasciâ angustâ atro purpureâ cinctis ultimo propè basin fasciato, aperturâ parvâ, fuscâ, labio interno subproducto.*

Axis 3 lin.

*Hab.* Straits of Malacca in seventeen fathoms.

Cab. Belcher.

## GEOLOGICAL SOCIETY.

June 21, 1843.—The following papers were read:—

1. "Supplement to a Memoir on the Fossil species of *Chimæra*." By Sir P. Grey Egerton, M.P., F.G.S.

Since the author's former memoir was communicated to the Society*, he has seen in the collection of Mr. Dixon a new and striking addition to the genus *Ischyodus*. The specimen is from the chalk of Southeram, and presents two dental plates only slightly dislocated from their natural juxtaposition. At first sight these would appear to be the dental armature of the lower jaw, corresponding nearly in size to the lower mandibles of *Ischyodus Mantelli*. A closer examination has satisfied Sir Philip Egerton that they are in reality the intermaxillary plates of the upper jaw of a most gigantic chimæroid. They exceed in size the corresponding teeth of *Ischyodus Townshendi*, the largest species hitherto found, by one third. As compared with the intermaxillaries of that species they are broader, more compressed and less robust in antero posterior diameter, and less hooked at the extremity. The form of the cutting edge is not truncate, as in the recent *Chimæra*, but prolonged to an acute angle, and bent downwards like the upper mandible of a bird of prey. The symphysis is smooth and slightly hollowed. The thin polished investing lamina of compact dentine is seen adhering to the surface of the tooth. On the interior surface this is marked with broad transverse irregularities similar to, although less distinct than, those seen in the recent *Chimæra*. A fragment in Mr. Dixon's collection gives evidence of having belonged to an individual of much larger size than that which furnished the specimens here described. Sir Philip Egerton proposes to name this species *Ischyodus Gigas*.

2. "On the occurrence of the remains of Insects in the Upper Lias of the county of Gloucester." By James Buckman, F.G.S.

The remains described in this paper were discovered by Mr. Buckman in a thin seam of argillaceous limestone in the upper lias beds at Dumbleton, a village twelve miles from Cheltenham, to which his attention had been directed by Mr. Brodie, who had suspected the existence of insect remains in the stratum. The section of Dumbleton Hill, which is a liassic outlier, presents the following beds:—

| | | ft. | in. |
|---|---|---|---|
| 1. | Sandy debris from the oolite, about | 10 | 0 |
| 2. | Upper lias shale: this is traversed at twelve feet from its base by the thin bed of fissile limestone five inches in thickness | 60 | 0 |
| 3. | Lias marlstone, about | 20 | 0 |
| | | 90 | 0 |

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* See vol. xii. p. 167.

The thin seam of limestone included in No 2 is remarkable for containing many organic remains not found in any other part of the lias, and most of them new, comprising land as well as marine animals and traces of plants. Among them are two undetermined species of fish with numerous fish-scales and coprolites two species of Crustacea the one allied to *Astacus* (Fabr ), the other to *Hippolyte* (Leach) A species of Loligo a new Belemnite a new Ammonite (which Mr Buckman has named *A Murleyi*) *A corrugatus* and *ovatus* a small univalve in great abundance, and *Inoceramus dubius* The remains of insects comprise one species of *Libellula* which, from the reticulations of the fine wings seems to belong to the genus *Æschna* Fabr , and has been named by Mr Buckman *Æ Brodiei* in honour of Mr Brodie , two species of Coleoptera of undetermined genera and a wing supposed to belong to *Tipula* None of these are of the same species with the insects found by Mr Brodie in the lower lias

From the presence of a similar band of stone with that containing the above mentioned fossils at Churchdown and Robin Hood Hill, liassic outliers presenting the same section as that of Dumbleton Hill, Mr Buckman supposes that this thin seam is of constant occurrence in the upper lias of the neighbourhood He concludes that the period which the state of things which produced it continued was not of long duration and that its deposition was of a quiescent kind

## MISCELLANEOUS

### ON A NEW SPECIES OF CERVUS, CERVUS DIMORPHE

BY B H HODGSON ESQ

In January last I procured from the Saul forest of the Morung a young stag rising two years, having horns of a unique character, and a stature and other attributes seeming to place him between the Axines and Rusans I considered this animal to belong to a new species, but as he was young and had the horns imperfect, I determined to wait awhile before noticing him to the Society The animal since his arrival has lived and flourished in my stable He is now nearly three years old, and his horns are perfect, but his pelage is in course of moult or change I will not however, longer defer giving a summary description and sketch of what I apprehend to be an undescribed though large and handsome species of deer This animal, like *Cervus Wallichii* and *Cervus Elaphoides* vel *Duvancellii*, possesses a mixed character, so that I hesitate to class it with any known group at present and shall merely indicate this attribute by assigning to it the trivial name of *Dimorphe* My specimen has been reared in confinement, yet it approaches the Rusans in size and stature, but retains, in youth at least, a good deal of the graceful Axine type Its horns are small, owing to confinement perhaps and it is possible that maturer age may develope more snags or antlers At present there is but one on each beam, and it has a very forward direction, as in *Elaphus* and our *affinis*, species to which the present one is also allied by its short tail and moderate suborbitar sinus

*Cervus Dimorphé*, mihi Deer with moderate pale, smooth horns Axine in the general style, but more bent in the middle of the beam, more divergent, and possessed of only one basal antler which is directed very forward, small, or moderate and vertical suborbital sinuses, interdigital pores, broad spreading ears and short stag-like tail Stature and aspect mediate between the Axines and Rusans In youth bright fawn red, spotted with white, in age nigrescent bay with blackish neck and belly, a dark list round the muzzle and white chin limbs pale Habitat the Saul forest —*Journal of the Asiatic Society of Bengal* No 58 p 897

### ON A SUPPOSED NEW SPECIES OF HIPPOPOTAMUS

### BY S G MORTON M D

It is about six months since I received from my friend Dr Goheen an extensive series of skulls of mammiferous and other animals from Western Africa they had been obtained by him during a residence of several years at Monrovia where he had officiated as colonial physician a situation which gave him great advantages for procuring the natural productions of that region Among these crania were two of a hippopotamus of small size from the river St Paul s Although nothing could be more manifest than the difference between the head of this animal and that of the common species I have hesitated to publish it from a fear that some one else may already have done so for I could hardly convince myself that so remarkable a species was wholly unnoticed in the systems Having however, searched the latest European works on zoology without finding any account of this interesting animal, I venture to submit the following facts in relation to it —

### HIPPOPOTAMUS MINOR

*Dental Formula*

$$\text{Incisors } \frac{4}{2} \text{ or } \frac{2-2}{1-1}, \text{ canines } \frac{1-1}{1-1}$$

$$\text{False molars } \frac{4-4}{4-4} \quad \text{molars } \frac{3-3}{3-3}$$

| | Inches |
|---|---|
| Length of the skull, measured from the anterior extremity to the notch between the condyles of the occipital bone | 12 3 |
| Zygomatic diameter | 8 |
| Parietal diameter | 3 5 |
| Distance between the orbits over the surface of the skull | 3 9 |
| Vertical diameter of orbit | 2 |
| Horizontal diameter of orbit | 1 8 |

These measurements have been taken from a very old individual, in which the sutures are entirely obsolete, and the teeth worn almost to the level of the jaw, and the contrast in size between this and the large or common species (familiar to every one as the *H amphibius*, but recently divided into two species the *H capensis* and *H sene-*

*galensis*) will be manifest to every one The difference, however, is not only in size but in all the proportions of the head

In the *H minor* there is a uniform *convexity* of the upper surface of the cranium from orbit to orbit, and between the occiput and ossa nasi while in the common species the orbits are remarkably elevated and the intermediate surface is *concave* The orbit is placed about midway between the occiput and snout, and the latter is consequently short, while in the large species the orbits are placed about one third the distance between the occiput and snout The *H minor* has only two canines in the lower jaw, the false molars are proximate to the canines and the base of the zygomata is in the same plane with the upper maxilla

The second skull of this species (which is of the same length as the other) is that of a younger animal for the sutures are open and the teeth in the process of changing from the deciduous to the permanent set The posterior molars are only partially protruded and rise obliquely from the jaws, like those of the elephant and mastodon

Dr Goheen who assured me from the first that he could find no notice of this animal in the systematic works, has obligingly favoured me with the following memorandum in relation to it — This animal abounds in the river St Paul s and varies in weight from 400 to 700 pounds They are slow and heavy in their motions, yet will sometimes stray two or three miles from the river, in which situation they are killed by the natives They are extremely tenacious of life and almost invulnerable excepting when shot or otherwise wounded in the heart When injured they become irritable and dangerous but are said by the natives never to attack them when in their canoes The negroes are very fond of the flesh which seems to be intermediate in flavour between beef and veal '

My comparisons with the common hippopotamus have been made on four specimens (three of which are fully grown) two from the vicinity of the Cape of Good Hope and two from the Senegal river — *Proceedings of the Acad Nat Sciences of Philadelphia*, Feb 27, 1844

### KENTISH BIRDS

*To the Editors of the Annals of Natural History*

Gentlemen,—In my last letter I complained of not having the wind N E by E which for the Kentish coast is the best wind for collecting birds It has been in that direction for some time and produced a good supply particularly the Whimbrel, which has oocurred in immense numbers and so tame that on their first arrival there was no difficulty in getting a good shot at them Greenshanks rather thinner this year than usual but the Redshank in great abundance I have also got two specimens of the Wood Sandpiper I only saw three, and succeeded in killing two, male and female About the 8th of last month I shot four beautiful specimens of the Purple Sandpiper, which are in good condition I have also some very fine specimens of the Lesser Tern, Common Tern and Sandwich Tern, with all of which the coast has been plentifully supplied during the easterly winds

About the 14th of last month I shot a very fine old male black Redstart in perfect plumage A pair of Golden Orioles have been in the large gardens at Kingsgate, which were there for nearly a week but I could not get a shot at them, being so very wild On Saturday last I also succeeded in shooting at about five miles from Margate a good specimen of the Rose-coloured Pastor there were two of them, one escaped that which I shot is a male I have also a good specimen of the Spotted Sandpiper, which was killed last year

144 High Street, Margate S MUMMERY

## SCIENTIFIC APPOINTMENTS IN TRINITY COLLEGE DUBLIN

It affords us very high gratification more especially at the present time when some of our English Universities seem disposed to make a retrograde movement in science to be able to announce that several appointments for the promotion of Natural Science have recently been made in Ireland s only University A chair of geology has been founded, and the distinguished Assistant Secretary of the British Association for the Advancement of Science, Mr John Phillips—who for some time filled the chair of geology in King s College London—has been appointed to it With Trinity College a museum has always been connected, but in these days of progress it had become quite of an antiquated character With the view of making it as extensively useful as possible particularly in objects of science a new office—Director of the Museum—has been formed, and Mr Robert Ball the well-known Secretary of the Royal Zoological Society of Ireland elected to fill it this gentleman making over to the College his own most valuable and extensive collection of natural history To secure to the College the large collection of plants made by Dr Coulter in California and Mexico and to have the benefit of his botanical services that distinguished traveller was a few years since appointed Curator of the herbarium and his collection became the property of the University After his lamented death, which occurred. about six months ago a successor to the new office was sought for and that most able botanist Mr William Henry Harvey was elected, the College, as in the case of Dr Coulter, securing the whole of his very large and important herbarium

About the same time the chair of botany became vacant, and Dr George J Allman, the most rising philosophical naturalist in Ireland, was elected to it Better appointments than these individually and collectively, could not have been made and the enlightened and liberal spirit with which they have been carried out is worthy of all admiration The best men, without reference to any previous connexion by education with the College or to any of those external influences which even at great seats of learning will affect elections, were appointed, their eminent fitness alone for the respective offices, without any of the ordinary alloy, deciding the election

When mentioning these appointments it is justly due to the memory of the late Dr Lloyd, Provost of Trinity College to state that it was his anxious wish to found a school of Natural History in the University over which he presided, and that it was in immediate course of being carried into effect in the year 1837 when interrupted by his sudden death

### HABITS OF THE MANTIS

In a letter from Herr Chr Zimmerman in Rockingham in North Carolina to Dr Erichson, editor of the 'Archiv fur Naturgeschichte,' in which he quaintly retorts upon the latter for incredulity respecting some former statements of his relative to the food of *Mantis Carolina* consisting of amphibia this fact is fully confirmed by the following additional observations —Your report having come to hand last September just the time when the *Mantides* begin to make their appearance, I had abundant opportunities of repeating my experiments Instead of the little striped lizard (*Scincus 5-lineatus*) as heretofore I made use of a species of newt (*Salamandra cirrhigera* Holbr) equally active and more abundant Its fate was as I anticipated One newt after the other was seized and to a greater or less extent devoured In vain did they endeavour, by rapid contortions of the body and blows with the tail, to elude the grasp of the mantis, which with the head depressed and the hinder part of the body tilted upwards, kept a firm hold of its victim and ate until it could eat no more I send you the very specimen of mantis with which these experiments were performed Whenever a mantis seizes another insect or small animal, the anterior fang like extremities are brought down to below the level of the head, so as to avoid having to sustain the weight of the prey —A T

### ETHNOLOGY

A tract has been published by M d'Omalius d Halloy '*Sur les Races Humaines*, of which the following is the account given by the author when presenting it to the Academy of Sciences He states that he had endeavoured to show that in classing the modifications of the human race the *natural characters* such as form and colour ought to take the precedence of language historical filiation, and other *social* considerations He then points out that the application of this principle leads him to remove the Hindoos and Abyssinians from the whites and to add them to the brown race, which thus becomes composed of three geographical groups, separated respectively by the Sea of Oman and the Gulf of Bengal He concludes with remarking upon the constantly progressive development of the whiter varieties of the human race, whilst the coloured races, and also the least fair of the white race are stationary or retrograde, whence it may be said, that notwithstanding the stability which now characterizes organic nature, there is yet in progress a phænomenon of a like kind with that which is revealed to us in the palæontological study of the terrestrial globe, which exhibits the successive appearance of species more and more perfect, fish having preceded reptiles, reptiles the didelphous mammalia, and these latter the monodelphous, man having come last, to crown the series —*Comptes Rendus*, April 15, 1844

### SAURIAN FOSSILS

For the following information we are indebted to Prof Bronn of Heidelberg

A collection of two Mystriosauri and six or seven Ichthyosauri, from the lias of Germany, will be sold together or separately at Heidelberg on the 1st of October 1844 All possess perfect heads (the bones being separate in the Ichthyosauri) the body complete as far as the tail and at least a portion of the extremities more or less perfect The Mystriosauri are of the species *M Mandelslohi* n sp, with 48 vertebræ, 11 feet long and *M longipes*, n sp, with 53 vertebræ and 5 feet long Five specimens of *Ichthyosaurus acutirostris* Ow, are respectively perfect as far as the 65th 102nd 117th 122nd and 123rd vertebræ, and one *I communis* (if it is not a new species), perfect to the 66th vertebra The Ichthyosauri (from 4 to 9 feet long) have been described in the Neue Jahrbuch fur Mineralogie 1844 p 385–408 pl 3 and 4 the Mystriosauri in the Supplement to the 'Gavials Fossiles du Lias by Bronn and Kaup, p 37–47 pl 5 and 6

Persons wishing for further information may obtain it from Prof H G Bronn of Heidelberg

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### METEOROLOGICAL OBSERVATIONS FOR MAY 1844

*Chiswick* —May 1 Dry haze excessively dry clear and fine 2, 3 Cloudless excessively dry 4 Slight rain 5—7 Overcast and fine 8 Dry haze 9 Sultry 10 Overcast very fine 11, 12 Very fine 13 Sultry 14, 15 Very fine 16 Cloudy and fine 17 Cloudy and windy 18, 19 Boisterous 20 Boisterous cold and dry 21 Drizzly 22 Dry haze very fine 23 Cold haze 24 Cloudy and cold fine 25 Overcast fine clear 26, 27 Cloudy and cold 28 Cloudy 29 Overcast slight drizzle rain at night 30 Cloudy 31 Overcast fine clear —Mean temperature of the month 1° 2 below the average

*Boston* —May 1—3 Fine 4 Cloudy 5—7 Fine 8, 9 Cloudy 10 Cloudy rain P M 11 Fine 12 Cloudy 13, 14 Fine 15 Cloudy 16 Fine 17 Rain 18 Cloudy rain P M, with rainbow 19 Windy 20, 21 Windy rain P M 22, 23 Cloudy 24 Cloudy rain P M 25—31 Cloudy

*Sandwick Manse Orkney* —May 1 Bright clear 2 Bright cloudy 3 Damp clear 4 Bright clear 5 Bright cloudy 6 Bright rain 7, 8 Bright clear 9 Damp rain 10 Drizzle damp 11, 12 Cloudy clear 13 Clear showers 14 Bright cleared 15 Cloudy 16 Cloudy showers 17 Showers 18 Clear showers 19 Bright clear 20 Bright cloudy 21, 22 Bright damp 23 Cloudy 24 Cloudy clear 25 Bright clear 26, 27 Bright cloudy 28, 29 Cloudy 30 31 Cloudy damp

*Applegarth Manse, Dumfries shire* —May 1—3 Fine, but parching 4—6 Very droughty 7 One slight shower A M 8 Fair 9, 10 Showers, slight 11 Fair, but cloudy 12, 13 Fair and clear 14 Cool 15—17 Fair and withering, 18 Hoar-frost A M 19, 20 Fair and very dry 21 Very high wind 22—28 Very withering 29 Hoar-frost 30 Hoar-frost dry 31 A few drops of rain

| | |
|---|---|
| Mean temperature of May | 52° 3 |
| Mean temperature of May 1843 | 49 4 |
| Mean temperature of spring water | 48 1 |
| Mean temperature of ditto May 1843 | 48 0 |

*Meteorological Observations made by* Mr Thompson *at the Garden of the Horticultural Society at* Chiswick, *near London, by* Mr Veall, *at* Boston, *by the* Rev W Dunbar *at Applegarth Manse,* Dumfries shire, *and by the* Rev C Clouston, *at Sandwick Manse,* Orkney

| Days of Month | Barometer | | | | | | | Thermometer | | | | | | | Wind | | | | Rain | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1844 May | Chiswick | | Boston 8¾ a m | Dumfries-shire | | Orkney Sandwick | | Chiswick | | Boston 8¾ a m | Dumfries shire | | Orkney Sandwick | | Chiswick 1 p m | Boston | Dumfries shire | Orkney Sandwick | Chiswick | Boston | Dumfries shire | Orkney Sandwick |
| | Max | Min | | 9 a m | 9 p m | 9½ a m | 8½ p m | Max | Min | | Max | Min | 9¾ a m | 8½ p m | | | | | | | | |
| 1 | 30 469 | 30 336 | 29 92 | 30 33 | 30 37 | 30 33 | 30 40 | 70 | 38 | 57 | 69 | 36 | 54 | 51 | e | calm | s. | w | | | | |
| ○ 2 | 30 432 | 30 336 | 29 94 | 30 40 | 30 30 | 30 42 | 30 37 | 71 | 46 | 58 | 68 | 40½ | 56 | 52 | e | e | s | w | | | | |
| 3 | 30 213 | 30 138 | 29 67 | 30 22 | 30 22 | 30 38 | 30 41 | 65 | 45 | 58 | 65½ | 38½ | 52 | 43 | ne | calm | sw se | w | | | | |
| 4 | 30 132 | 30 090 | 29 72 | 30 29 | 30 21 | 30 40 | 30 35 | 59 | 48 | 51 5 | 58½ | 44 | 48 | 42 | ne | calm | ne | e | ·01 | | | |
| 5 | 30 060 | 29 913 | 29 62 | 30 12 | 29 98 | 30 24 | 30 18 | 72 | 43 | 57 | 68 | 44 | 50 | 48 | ne | calm | ne | s | | | | |
| 6 | 29 867 | 29 791 | 29 33 | 29 86 | 29 75 | 29 90 | 29 16 | 72 | 36 | 60 | 70 | 42 | 54 | 50 | e | calm | se | se | | | | 10 |
| 7 | 29 868 | 29 792 | 29 25 | 29 79 | 29 85 | 29 90 | 29 94 | 76 | 43 | 61 | 63 | 46½ | 50 | 46 | n | calm | nw | w | | | 0 02 | 50 |
| 8 | 29 947 | 29 944 | 29 44 | 29 90 | 29 89 | 29 92 | 30 33 | 69 | 44 | 56 | 66 | 38½ | 50 | 54 | e | calm | s | se | | | | |
| ☾ 9 | 29 962 | 29 933 | 29 48 | 29 89 | 29 86 | 29 98 | 29 87 | 78 | 49 | 53 | 62½ | 34 | 56 | 51 | sw | calm | s | s | | | | |
| 10 | 29 942 | 29 910 | 29 34 | 29 84 | 29 91 | 30 00 | 30 30 | 68 | 38 | 56 | 55½ | 41 | 48 | 46 | w | w | nw | w | 07 | | | 58 |
| 11 | 30 060 | 29 931 | 29 44 | 30 01 | 30 03 | 30 10 | 30 31 | 64 | 52 | 57 | 62 | 49½ | 52 | 48 | ne | calm | sw | n | | 35 | | 10 |
| 12 | 30 262 | 30 183 | 29 64 | 30 10 | 30 21 | 30 10 | 30 29 | 72 | 41 | 56 | 66½ | 42½ | 53 | 46 | ne | calm | sw | sw | | | | |
| 13 | 30 335 | 30 309 | 29 70 | 30 28 | 30 28 | 30 22 | 30 14 | 78 | 39 | 63 | 66½ | 43 | 53 | 47 | ne | calm | w | sw | | | | |
| 14 | 30 322 | 30 272 | 29 73 | 30 29 | 30 31 | 30 33 | 30 37 | 70 | 38 | 60 | 64½ | 51½ | 48 | 47 | ne | calm | ene | nw | | | 0 26 | 07 |
| 15 | 30 365 | 30 285 | 29 87 | 30 38 | 30 30 | 30 41 | 30 33 | 60 | 41 | 52 | 65 | 46 | 48 | 45 | ne | n | ene | w | | | | |
| 16 | 30 242 | 29 961 | 29 77 | 30 10 | 29 94 | 30 12 | 30 06 | 65 | 40 | 55 | 63 | 37 | 49 | 46 | ne | calm | sw | sw | | | | |
| ◗ 17 | 29 964 | 29 886 | 29 40 | 30 00 | 29 98 | 30 05 | 30 06 | 59 | 32 | 49 5 | 53 | 41 | 38 | 36 | ne | ne | n | nw | | | | 10 |
| 18 | 29 989 | 29 927 | 29 49 | 30 01 | 30 13 | 30 02 | 30 24 | 54 | 44 | 47 | 51 | 31½ | 43 | 40 | ne | n | ne nw | n | 02 | 07 | | 15 |
| 19 | 29 997 | 29 956 | 29 64 | 30 17 | 30 15 | 30 30 | 30 30 | 60 | 43 | 51 | 54½ | 34 | 46 | 43 | ne | e | nne. | n | | 04 | | |
| 20 | 29 988 | 29 982 | 29 62 | 30 13 | 30 08 | 30 00 | 30 26 | 63 | 40 | 51 | 52½ | 35½ | 50 | 45 | ne | n | n | n | | | | |
| 21 | 29 926 | 29 858 | 29 43 | 30 05 | 30 22 | 30 33 | 30 48 | 62 | 46 | 52 | 61 | 43 | 52 | 50 | ne | ne | ne | w | 02 | 03 | | |
| 22 | 30 164 | 30 146 | 29 66 | 30 25 | 30 29 | 30 41 | 30 40 | 67 | 46 | 53 | 65 | 47 | 48 | 45 | ne | e | nne | w | | 02 | 0 00 | |
| 23 | 30 136 | 30 086 | 29 70 | 30 24 | 30 16 | 30 40 | 30 34 | 70 | 43 | 53 | 69½ | 50 | 50 | 46 | ne | ne | ne | n | | | | |
| 24 | 30 076 | 29 968 | 29 55 | 30 22 | 30 08 | 30 25 | 30 22 | 66 | 45 | 54 | 66 | 43½ | 49 | 46 | ne | n | ne. | w | | | | |
| ☽ 25 | 30 103 | 30 019 | 29 58 | 30 14 | 30 20 | 30 26 | 30 30 | 65 | 40 | 51 5 | 62 | 44½ | 47 | 43 | ne | ne | ne. | nw | | 01 | | |
| 26 | 30 206 | 30 156 | 29 70 | 30 27 | 30 30 | 30 35 | 30 34 | 58 | 41 | 51 5 | 60 | 38½ | 48 | 47 | ne | ne | ne | nw | | | | |
| 27 | 30 199 | 30 125 | 29 81 | 30 27 | 30 25 | 30 40 | 30 34 | 56 | 43 | 51 | 61 | 33½ | 50 | 46 | ne | ne | ne | nw | 06 | | | |
| 28 | 30 026 | 29 956 | 29 73 | 30 18 | 30 08 | 30 36 | 30 22 | 59 | 48 | 53 | 61 | 39½ | 48 | 46 | e | ne | ne | w | | | | |
| 29 | 29 935 | 29 927 | 29 55 | 30 06 | 30 04 | 30 20 | 30 20 | 58 | 44 | 52 | 59 | 43 | 50 | 47 | ne | ne | ene | ne | 07 | | 0 00 | |
| 30 | 30 023 | 30 002 | 29 55 | 30 03 | 30 05 | 30 16 | 30 18 | 61 | 45 | 52 | 58½ | 45 | 50 | 45 | ne | ne | ene | ne | | | | |
| ○ 31 | 30 035 | 30 001 | 29 54 | 30 08 | 30 03 | 30 20 | 30 15 | 61 | 42 | 52 5 | 60 | 41½ | 50 | 46 | e | calm | ene | nw | | | | |
| Mean | 30 104 | 30 036 | 29 60 | 30 103 | 30 111 | 30 207 | 30·220 | 65 10 | 42 68 | 54 3 | 62 1 | 42 1 | 49 67 | 46 22 | | | | | 0·25 | 0 52 | 0 28 | 1 60 |

THE ANNALS.

AND

MAGAZINE OF NATURAL HISTORY.

No 89 AUGUST 1844

## XII — *An Account of some enormous Fossil Bones of an unknown species of the Class* Aves, *lately discovered in New Zealand* By the Rev William Colenso

It was during the summer of 1838 that I accompanied the Rev. W Williams on a visit to the tribes inhabiting the East Cape district Whilst at Waiapu (a thickly inhabited locality about twenty miles S W from the East Cape), I heard from the natives of a certain monstrous animal, which, while some said it was a bird, and others " a person," all agreed that it was called a *Moa*, that in general appearance it somewhat resembled an immense domestic cock, with the difference, however, of its possessing a "face like a man," that it dwelt in a cavern in the precipitous side of a mountain, that it lived on air, and was attended or guarded by two immense *Tuataras**, who, Argus-like, kept incessant watch while the *Moa* slept, and that if any one possessing temerity sufficient dared to approach the dwelling of this wonderful creature, he would be infallibly killed by it an act which it was said to execute much in the same manner as that by which those unhappy criminals are summarily punished in the dominions of the native Indian princes, by the trampling of an elephant, and at which feat this celebrated *Moa* was quite expert

A mountain, named Wakapunake, at least eighty miles distant in a southerly direction, was spoken of as the residence of this creature, where however only one existed, which one, it was contended by the many, was the sole survivor of the *Moa* race, although they could not assign any possible reason why it should have become all but extinct

While, however, the existence of the *Moa* was universally believed, (in fact, to dare to doubt of such a being amounted in the native estimation to a very high crime,) no one person could be found who could positively testify to his having had ocular proof of the existence of the animal, for while with every one it was a matter of the profoundest credence, that belief only rested on the bare and unsupported assertion of others Many of the natives, however, had from time to time seen very large bones, larger, from their account, than those of an ox, these bones they cut up into small pieces for the purpose of fastening to their fish-hooks as a lure instead of the *Haliotis* shell*, it answering that purpose much better, from its going more equably through the water

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* See Note A , Appendix

It was almost ludicrous, whilst at the same time it showed the powerful effect which this belief of theirs had over them, to witness their unconcealed fear, almost amounting to horror, on being requested to go to the residence of the *Moa* to procure it, or as a guide thither for that purpose Unlike, too, what has been very frequently observed in savage nations, this fear seemed not to arise from any degree of superstitious dread, but merely from an abiding conviction of the physical powers of this prodigious animal, as well as from their belief of the moral certainty of such powers being put into immediate action, if they dared to intrude within the precincts of his resort

As a matter of course, I treated the whole story (as far as related to the present existence of such an animal) as fabulous, looking on it as one more of those many peculiar tales and legends which so abounded in the "olden time," and which every nation under heaven invariably possesses, and I could but think what an excellent companion for the celebrated *roc*† of oriental story and fairy-tale for the nursery it would have made, had it but been known a little earlier

On our return to the Bay of Islands, several natives from the East Cape district accompanied us From them I subsequently received pretty nearly the same detail concerning the *Moa*, as I had given me before when in that neighbourhood

In the following year, 1839, the Rev W Williams again visited that district, accompanied by the Rev R Taylor The non-arrival, by the time appointed, of the vessel by which these gentlemen were to return to the Bay of Islands, (and through which cause they were detained a fortnight at the East Cape,) afforded them much more leisure time than I had when there Mr Taylor, hearing of this *Moa*, prosecuted his inquiries, and was subsequently rewarded with the discovery of (what appeared to be) a part of a fossil *toe* (or rather claw?) of some gigantic bird of former days

In the summer of 1841–2, I again visited those parts At Waiapu I gained the information, that Wakapunake (the mountain where the *Moa* was said to reside) had been visited by some baptized natives, purposely to ascertain the truth of the common belief, and which they declared to be altogether without foundation, finding neither cavern, nor lizard-guards, nor *Moa*, nor any signs of such uncommon *lusus naturæ*. But what was of far greater interest to me than this relation of theirs, were some bones which I had the good fortune to procure from them, and which were declared by the natives to be true *Moa*-bones. These bones, seven in number, were all imperfect, and comprised five *femora*, one *tibia*, and one which I have not yet been able satisfactorily to determine. The largest *femur*, consisting of the diaphysis only without the processes, measured 8 inches in length, and 4¾ inches in girth in the narrowest part. The portion of the *tibia*, which like the *femur* consisted only of the middle part, measured in length 6 inches, and in circumference 4 inches at the narrowest and 5 inches at the widest part. The remaining bone, the largest of all, which was merely a section, measured in length 6 inches, and in circumference 7¼ inches at the smallest part. These bones were all (excepting the last-mentioned) of a very dark colour, almost a ferruginous brown, and appeared to have entirely lost their oily matter. They were very stout, especially the *tibia*, and were strongly marked and indented on the outside with muscular impressions. What little remained within of the reticulated cells appeared to be nearly perfect. They were all found by the natives in the Waiapu river, and were collected by them for the purpose of cutting up and attaching to their fish-hooks, in order to fish. The portion of *tibia* which I obtained had been sawn across by the native in whose possession it was, for that purpose. I also obtained several hooks, each having portions of *Moa's* bone attached to it. I could not however ascertain, from the smallness of the slips, whether these had been originally cut out of such bones as those I had just procured, or whether they had not been sawn from bones of a different description and larger size.

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* See Note B, Appendix

† See Note C, Appendix

Leaving Waiapu, and proceeding by the coast towards the south, I arrived at Poverty Bay, where the Rev. W. Williams resided. This gentleman had had the good fortune to procure a nearly whole *tibia* of an immense bird, without however the entire processes of either end. This bone measured about 18 inches in length, and was proportionably thick. Mr. Williams wishing to send this unique relic to Oxford, I left a pair of *femora* to accompany it, in order, if possible, to obtain from that seat of learning some light on these increasingly interesting remains. At Poverty Bay I made several inquiries after *Moa* bones, but to little purpose, as I could not obtain any.

Quitting Poverty Bay, and still travelling in a southern direction, I soon came within sight of Wakapunake, the mountain celebrated as the residence of the only surviving *Moa*. As natives lived about its base, among whom my route lay, I looked forward with no small degree of interest to the obtaining at least some *Moa* relics in this locality, in this however I was disappointed At the close of the second day's travel we arrived at "Te Reinga" (a village situated at the foot of the mountain), where, as opportunity offered, I inquired of the natives relative to the *Moa* In reply to my reiterated queries, they said that he lived there in the mountain, although they had never seen him, but that the *Moa* bones were very commonly found after floods occasioned by heavy rains, when they would be washed up on the banks of gravel in the sides of the rivers and exposed to their view, still they had not any at that time by them I offered large rewards for any that should be found hereafter, and which were to be taken to Mr Williams at Poverty Bay Here, as at Waiapu, no one person could be found who possessed the hardihood positively to assert that he had seen the *Moa*, although this neighbourhood had ever been the dwelling-place of that tribe The mountain, too, it appeared was by no means unknown to them, for, during a war between themselves and the Urewera tribe a few years ago, they had fled for refuge to their stronghold on the top of Wakapunake, where they had lived for some time, and where many of their relatives eventually fell into the hands of the enemy, who starved them into a surrender and took the place Here then was still further proof (if proof was wanting), that no such colossal animal could possibly at this time be *existing* in this place The spot, however, was well-chosen for the fiction of such a creature's residence a huge, table-topped and lofty mountain, covered with primæval forests of gloomy pines, its brow singularly adorned with a horizontal stratum of whitish sandstone, which ran continuously and precipitously for more than two miles At the base of the mountain ran the river Wangaroa, down which we paddled in canoes for some distance This river is a branch of the Wairoa river, which disembogues into Hawkes' Bay

These natives further informed me that a *Moa* resided at a certain high mountain in Te 'Waiti district, nearly five days' journey into the interior, in a N W direction from the place where we now were, and that *there* I should find people who had actually seen the animal If I was little inclined to believe in the story of its existence before, I was much less inclined to do so now, however, as my route lay that way, I determined to make every possible inquiry after it

Fifteen days after this I arrived at Te 'Waiti, the principal village of that district and not far from the residence of the second *Moa* Here however, as before, the people had never seen a *Moa*, although they had always heard of, and invariably believed in, the existence of such a creature at that place They, too, had not any bones in their possession, though such, they said, were very commonly seen after heavy floods The following day I passed close by the mountain where this *Moa* had resided for so many years, but noticed nothing more than usual (although I availed myself to the utmost of the use of my pocket telescope), save that this part of the country had a much more barren and desolate appearance than any I had hitherto witnessed

I returned in the autumn to the Bay of Islands, without gleaning any further information relative to the *Moa*

It should however appear (from information which I have recently received from the Rev W Williams), that very shortly after my leaving Poverty Bay, a *Moa* bone was brought him by a native which he immediately purchased The natives in the neighbourhood hearing of a price being given for such an article as a bone, which they had ever considered as of little worth, were stimulated to exertion, and a great number, perhaps more than a hundred persons, were soon engaged in the field, actively searching after *Moa* bones, the result was, that Mr Williams soon had the pleasure of receiving a large quantity of fossil bones, some of which were of an enormous size, and in a good state of preservation The bones, though numerous, were not in any great variety, chiefly comprising such as I have already mentioned, i e those of the *femur* and *tibia*, together with those of the *tarsus*, the lower part of the *dorsal vertebræ*, and a portion of the *pelvis* Altogether, the bones of nearly thirty birds, apparently of one species only, must have been brought to Mr Williams From the great difference in the sizes of some of them when compared with each other, Mr Williams came to the conclusion, that the animal to which they once belonged must have been very long-lived Whilst, however, I do not perceive how far this inference is to be correctly deduced from the mere difference in the size of the bones, we know that longevity is common to very many of the feathered race, particularly to those of the larger kinds One of the bones, a *tibia**, measured 2 feet 10 inches in length, and was proportionably thick Two others measured, each, 2 feet 6 inches in length Another, a section of a *femur*, measured 8 inches in circumference in the smallest part On putting together the bones of the leg and thigh (although none of them exactly fitted), and making the necessary allowance for the portions deficient of the processes of the joints, the intermediate cartilages, and lower tendons and integuments of the foot, we obtain at least six feet of the lower extremities of a bird, which, supposing its upper parts to accord in size with the lower ones, must have measured in altitude when alive, at the lowest rate of calculation, from 14 to 16 feet ! ! An enormous feathered monster, well worthy, from its gigantic size, of being classed with the *Megalosaurus* of Buckland and the *Mastodon* of Cuvier

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* This has been sent by Mr Williams with several others to Prof Buckland

It so happened that about this time a mechanic, who had been living at Cloudy Bay in the Middle Island, came to reside at Poverty Bay He stated that this bird now existed in the high hills near Cloudy Bay; and that two Americans, residents at that place, hearing from a native that such a bird lived on the mountainous and snowy heights, provided themselves with arms, and thus equipped, went in high expectation of shooting one, taking the native with them as their guide They ascended the mountain to the place where these birds resort, and, at the native's request, hid themselves behind some bushes Presently they saw the monster majestically stalking down in search of food, they were, however, so petrified with horror at the sight as to be utterly unable to fire on him They observed him for near an hour, ere he retired, and were glad enough at last to make their escape They described this animal as being about 14 or 16 feet in height

The bones from which the annexed drawings* were made, were all found at Turanga (Poverty Bay) They comprise a *tibia*, a *femur*, a *tarsus*, and fragments of a *pelvis* and *dorsal vertebra* of a *Moa* They are very stout, are deeply marked with muscular impressions, and are in a good state of preservation 1 The *tibia*, which is nearly perfect, measures 30 inches in length, and in girth, at the largest end, (where it was much broken away at the edges of the processes, and consequently reduced in size,) 16½ inches, at the smallest end 12½ inches, and in the smallest part, near the middle of the bone, 5¼ inches There are not any remains of a fibula, however rudimentary, attached to the tibia, nor is there any apparent mark of attachment to indicate that such formerly adhered thereto The largest tibia yet found in nearly a perfect state, measured 4 inches more in length than this† 2 The *femur*, which also is nearly perfect, measures in length 13 inches, in girth, at the one end over the head of the femur, 11¼ inches, at the thickest end 12½ inches, and in the smallest part 5½ inches the reticulated muscular impressions on this bone are very numerous and well-defined I have seen a portion of a femur, the small part of which measured in girth 8 inches! 3 The *tarsus* (a small one), nearly perfect, measures in length 10 inches, and in girth at one end 9 inches, and at the opposite end 8 inches, and in the smallest part 4 inches this bone is comparatively very short and flat, and has articulations for only three toes 4 The portion of the *bone of the back and pelvis* is not so perfect, being a much-broken fragment, comprising from the upper outer edge of the *acetabulum* of the *os innominatum* to the lower joint of the *dorsal vertebræ,* in which the canal for the *medulla spinalis* is perfect This bone, or rather fragment, measures, from the outer edge of the reticulation of the head of the *os femoris* to the outer broken edge of the bone (which is that portion approaching towards the upper part of the bone of the *pelvis*), 11 inches, and across the inner and smallest part of the bone, immediately beneath the last of the *dorsal vertebræ,* where it was most perfect, 7 inches a correct idea cannot however be given of such a fragment as this, through the medium of a written description This bone evidently differs very considerably from such bones in other birds, in its peculiar carinated shape in that portion of it which must have formed the highest part of the lumbar region, it must have been also considerably larger when entire, as the whole of the upper ridge is much broken This bone is also very deeply indented with muscular impressions

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* Drawings of these bones were sent to the Tasmanian Society, together with the original monographs

† I much regret that I had not an opportunity of inspecting the largest and most perfect bones ere they were sent to England A vessel sailing from Turanga for Port Nicholson, by which opportunity they were sent, was the reason of my not seeing them

Having thus given, it is to be feared, rather a tedious detail of the *Moa*, and of the bones hitherto found, little more remains, at present, for the writer, than deferentially to offer a few remarks on the bones in question, and these suggestions which he has to submit may be noticed under two general heads First, does the *Moa* now exist? or, at what period of time is it probable that it existed? Secondly, to what order or family can we reasonably suppose the *Moa* to belong?

It is very true that at this time we have but little to assist us in our search, nevertheless, let us commence and prosecute our inquiry, judiciously considering such aids as may present themselves to our notice in the course of our investigation at all bearing on the subject before us

Our first inquiry then will be, does the *Moa* now exist? or, at what period of time is it probable that it did exist? To the first of these queries I reply, that it is my opinion that the species of bird whose bones we have now before us does no longer exist, at least in New Zealand a few reasons for this opinion of mine I will here adduce

From my knowledge of the New Zealander, I can but believe that there is no part of his native land which has not been trod by him, at one time or other, however mountainous or dreary it may be As a proof of this, I might mention their having proper names for every portion of land and water, whether hill or dale, lake or running stream, and their never being at a loss in describing distant or unfrequented parts of their own country, some one or other present among the "listening crowd" having either visited the places spoken of, or received a narration from some one who had Now, as no New Zealander is to be found who can positively state that he has actually seen such a bird, and as every nook and corner of the land is well known to the natives, I conclude that the animal in question no longer exists in New Zealand In recording this opinion, it will be seen that I pay no attention whatever to the strange and fearful account given of the *Moa* by some natives, a relation which carries with it its own proof of being false, as I know full well the *powers* of the New Zealander for romance, of which description of stories they have not a few among them The account, too, furnished the Rev W Williams from the two American settlers, I also, in like manner, reject, but only as far as the bird whose bones we have before us is concerned A very large and peculiar bird *may* exist in the mountainous district of the Middle Island, in fact, we know that several large birds well known to the natives, though hitherto unknown to science, live on the high hills in the Northern Island But I cannot persuade myself to receive one man's relation as perfectly correct in every particular, against the united testimony of those persons from among the different tribes of the Northern Island with whom I have conversed on the subject, that person, too, an unscientific man, receiving his relation from others, who, by their own account, were not only powerfully operated on by fear, but who are also from that country in the "far west" whose natives are proverbially famed for their "long yarns"

In thus, however, disposing of that part of the question relative to the *present* existence of the *Moa*, we have still to inquire, at what period of time is it probable that this bird existed? And here, I think, we have to consider, first, the situation in which the bones are found, and secondly, any additional evidence which native tradition may be able to afford us

The *Moa* bones, as far as I have been able to ascertain, have hitherto been only found within the waters and channels of those rivers which disembogue into the southern ocean, between the East Cape and the S head of Hawkes' Bay, on the E coast of the Northern Island of New Zealand And, as I have before observed, they are only, when wanted, sought for after floods occasioned by heavy rains, when, on the subsiding of the waters, they are found deposited on the banks of gravel, &c in the shallowest parts of the rivers These rivers are, in several places, at a considerable depth below the present surface of the soil, often possessing a great inclination, at once perceived by the rapidity of their waters They all have more or less of a delta near their mouths, from a slight inspection of which it is known that their channels have, in those places at least, considerably changed The rocks and strata in these localities indicate generally both secondary and tertiary formations, consisting, the former of argillaceous schist, sandstone, conglomerate, green sand, &c , the latter of clay, marl, calcareous tufa, sand, gravel, and alluvial deposits The real depositum, however, of the *Moa* bones is not certainly known

From native tradition we gain nothing to aid us in our inquiries after the probable age in which this animal lived, for although the New Zealander abounds in traditionary lore, both natural and supernatural, he appears to be totally ignorant of anything concerning the *Moa,* save the fabulous stories already referred to If such an animal ever existed within the times of the present race of New Zealanders, surely, to a people possessing no quadruped*, and but very scantily supplied with both animal and vegetable food, the chase and capture of such a creature would not only be a grand achievement, but one also, from its importance, not likely ever to be forgotten, seeing too that many things of comparative minor importance are by them handed down from father to son in continued succession, from the very night of history Even fishes, birds and plants, (anciently sought after with avidity as articles of food, and now if not altogether, very nearly extinct,) although never having been seen by either the passing or the rising generation of aborigines, are, notwithstanding, both in habit and uses, well known to them from the descriptive accounts repeatedly rehearsed in their hearing by the old men of the villages This very silence, however, I embrace as a valuable auxiliary evidence, bearing me out not a little in my conjecture, that the bones of the *Moa* will probably be found lying either in the upper stratum of the secondary or the lower strata of the tertiary formation In fact, unless we suppose this immense bird to have existed at a period prior to the peopling of these islands by their present aboriginal inhabitants, how are we to account for its becoming extinct, and, like the *Dodo,* blotted out of the list of the feathered race? From the bones of about thirty birds found at Turanga in a very short time and with very little labour, we can but infer that it once lived in some considerable numbers, and, from the size of those bones, we conclude the animal to have been powerful as well as numerous What enemies then had it to contend with in these islands, where, from its colossal size, it must have been paramount lord of the creation, that it should have ceased to be? Man, the *only* antagonist at all able to cope with it, we have already shown as being entirely ignorant of its habits, use, and manner of capture, as well as utterly unable to assign any reason why it should have thus perished

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* See Note D , Appendix

The period of time then in which I venture to conceive it most probable the *Moa* existed, was certainly either antecedent or coetaneous to the peopling of these islands by the present race of New Zealanders

But we will proceed, and endeavour to ascertain (as we proposed in the second place to do) to what order or family is it likely that the *Moa* belongs? In making this inquiry, we have little to assist us but the bones before us, from an attentive consideration of which we are necessarily led to conclude that the animal must have been of large size and great strength, and, from the shortness of the *tarsus* (when compared with the length of the *tibia*), we also perceive it to have been short-legged From its size, we shall naturally be led to seek for its affinities among either the *Raptorial* or *Rasorial* orders, but from its *tarsi* possessing only articulations for three toes, we are at once precluded from supposing that it belonged to the former order, to which we may also add, *first*, the (so to speak) evidence of negation, of not a single specimen or fragment of a wing-bone having yet been found, and, *secondly*, the judicious observation of Cuvier (in reference to the family of *Struthionidæ*), that it would be morally impossible to fit such heavy bodies with wings sufficient to enable them to fly* In the latter, however (the Gallinaceous or Rasorial order), we have the largest and stoutest birds known, these too are terrestrial in their habits, some exclusively so, and very often possess only three toes It is true, that in general the different known members of the family containing the largest birds have their *tarsi* long, (whereas those of the *Moa*, as we have already seen, are short,) yet to this we have exceptions in the *Dodo* (alas! no more) and the *Apteryx* And I think it is highly worthy of notice, that the latter, the only known existing genus of the family possessing short *tarsi*, is entirely confined to these islands

From a conviction, then, that it is in this order only that the affinities of the *Moa* are to be sought with any prospect of success, and that it is in the family *Struthionidæ* where they will, doubtless, eventually be found, we are induced, for the present at least, to place the *Moa* in that gigantic group In the absence, however, of a specimen of an *Apteryx** with which to compare the few bones we at present possess of the *Moa*, I should, I confess, be hazarding an opinion in saying that it was most nearly allied to that peculiar genus, yet when we consider, that out of the *five* existing genera of this family, three at least, apparently possessing the nearest affinities to the remains of the bird before us, belong exclusively to the southernmost parts of the southern hemisphere†, and that a connecting link is, as it were, wanting between the *Rhea* of the Straits of Magellan, the *Dromiceus* of New Holland, the *Casuarius* of the Indian Archipelago, and the *Apteryx* of New Zealand, and that this connecting link *may*, in all probability, be supplied in the *Moa*, I think we shall be constrained to assign our *Moa* a place between the genera *Casuarius* and *Apteryx*, possessing as it does (only in a much greater degree) the immense size and strength of the former, combined with the short tarsi, and probably wingless structure of the latter

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* The Baron's words are, "It appears as if all the muscular power which is at the command of nature would be insufficient to move such immense wings as would be required to support their massive bodies in the air —'Règne Animal,' Class Aves, ord 5 fam 1 —If such were the spontaneous remarks made by that illustrious naturalist on contemplating the size of the known members of that family, what would he not have said, had he but lived to examine the colossal structure of the *Moa*!

I venture however to suppose, that we may gain an additional gleam of light, both upon the probable period at which the *Moa* existed, and also on the family to which it may be allied, by a consideration of the etymology of its name The word *Moa*, whence is it derived? I confess, I know not any New Zealand word from which it may be supposed to have derived its origin And this will seem the more remarkable when we consider, that a very great number of New Zealand appellatives are not only derived and easily traceable, but are also generally highly expressive of some action or quality of the thing itself, chiefly too is this to be observed when such action or quality is peculiar or uncommon But in the *Moa*, the most uncommon animal New Zealand has ever produced (especially in the estimation of a native), we have a cognomen which seems an entire exception to the common rule, for, as far I understand it at present, it has, in reference to this immense animal, no meaning whatever Further, it may not be amiss also to notice *en passant*, that it is of rare occurrence in the language to find anything bearing so very *short* an appellative as the bird in question In the Friendly, Society, and Sandwich groups, the term "*Moa*" has been, I believe, invariably given by the natives of those islands to the domestic cock, and used as the proper name for that animal by the missionaries there The New Zealander, in relating his fabulous account of the *Moa*, almost invariably said, it was like a "*tikaokao*," i e a cock, (they having given the cock that name from its crow, which to them sounded like those letters when drawn out and pronounced after their manner,) and that it was adorned with wattles, &c Without at all, at present, entering into the question as to what country or countries the existing race of New Zealanders emigrated from to these islands, the popular belief, that at least a portion of them is of Malay origin, is, I think, in connexion with the name of this bird, worthy of notice, for whilst we know the term "*Moa*" is used to denote the cock in the Friendly Islands and other groups, it is only in the isles of the Indian Archipelago that the cassowary (*Casuarius Casoar*, Briss ) is to be found, and this bird too is "heavy and stoutly built," and the only one of the whole family of *Struthionidæ* possessing wattles, for, according to Cuvier, it "has the skin of its head and top of the neck naked, of an azure-blue and fiery-red colour, with pendent caruncles like those of the turkey, and is the largest of all birds next to the ostrich*" May we not, I would ask, be allowed to conjecture, that in that now long-past period, when the forefathers of the present race of aborigines first landed on these shores, a few of those New Zealand birds might still be found in the most secluded and mountainous retreats, having hitherto escaped the repeated inroads of the original inhabitants (or, we may suppose that the bones only were seen and identified to belong to a bird by those new-comers), to which, from their real or supposed resemblance to those of the cassowary, they gave the name of *Moa*, the name which that giant bird bore in their fathers' land?

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* It has been my good fortune to have at different times several specimens of the *Apteryx* in my possession, at present, however, I have not one, nor do I know in whose possession one is to be found in New Zealand

† See Note E, Appendix

This conjecture, however, may be much more fully established, on ascertaining the name by which the cassowary is known to the present inhabitants of the islands of the Indian Sea

The ornithology of New Zealand, now that these islands are become a British colony, will soon be known, and we may rest assured, that *if* such an animal exists, it cannot much longer remain concealed And, it is further to be hoped, that ere long we shall be enabled to find somewhat more of the fossil remains of the *Moa*, so as not merely to form in part conjectural opinions on its size, habits and affinities, but so as to be well assured of what this prodigious creature really was

WILLIAM COLENSO

**Paihia, Bay Islands, New Zealand, May 1, 1842**

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* Vide Cuvier, 'Regne Animal, class Aves, gen *Casuarius*

## APPENDIX

### Note A, page 81

The *Tuatara* is an animal belonging to the class *Reptilia*, order *Sauria*, but to which of the families composing the same, I cannot, in the absence of books of reference, at present determine It appears to possess characters common to *Lacertinidæ* and *Iguanidæ* in its having the thin and extensible tongue of the former, combined with the undivided one of the latter It is common in some parts of New Zealand, particularly on rocky headlands and islets lying off the coast I have one at present in spirits, which I had alive for nearly three of the winter months, during which time, although I repeatedly tried to get it to take some kind of food, I could not succeed From its habits I supposed it to be a hybernating animal It measured 19 inches in length, had a row of elevated spines (or rather recurved scales) nearly the whole length of its back, and appeared a perfectly harmless creature It was taken, with two others, on Karewa islet, off Tauranga harbour in the Bay of Plenty The natives speak of another species possessing a forked tail' and assert that a larger species, which inhabits swampy places, has been seen six feet in length, and as thick as a man's thigh The largest, however, that I have ever heard of did not measure above two feet in length

### Note B, page 82

The shells of several species of *Haliotis*, *Ostrea*, and other nacrescent genera, are commonly used by the natives inhabiting the isles of the South Pacific for this purpose A narrow slip of the shell is firmly fastened to the back of the hook, the barb of which is generally concealed by a tuft of metallic surfaced blue feathers, procured either from the Korora (*Aptenodytes minor*) or the Kotaretare (*Dacelo Leachii*) The hook thus prepared and attached to a stout line, composed of the fibres of the Korari (*Phormium tenax*), which, after being cleaned from the parenchymatous parts, are twisted together with the hand, is drawn quickly through the water by a person paddling a small canoe, the larger fish, believing this glittering lure to be their prey, eagerly pursue it, and greedily catching at the same are taken In favourable weather a great number of fine fish are soon captured by this method Among the New Zealanders it is a very favourite sport, and one that is not a little animating, when several canoes are engaged I have seen upwards of twenty small canoes thus employed on a fine summer's evening, on the beautiful sheet of water in the Bay of Islands I may here mention, that previous to the introduction of the Gospel among the New Zealanders, their hooks were often composed of human bone, those of their enemies being used for that purpose Sometimes they formed their hooks from the tough stalks and branches of Tauhinu (*Pomaderris ericifolia*) and Mangemange (*Lygodium volubile*), hardening them by the aid of fire At present they invariably prefer the hooks which they make from iron nails to those of our manufacture, the latter, they allege, being much too brittle

### Note C, page 82

Whoever has read the marvellous 'Thousand-and-one Nights' must be well acquainted with the monstrous stories related of this extraordinary bird, its celebrity, however is not confined to that work "*Rukh*," says the author of the Arabic Dictionary "is the name of a monstrous bird which is said to have powers sufficient to carry off a live rhinoceros" To this animal Marco Polo also refers, in his relation of the story of the ambassadors —"The *rukh* is said, by persons who have seen it, to measure sixteen paces across the wings from tip to tip, the feathers of which are eight paces in length, and thick in proportion A feather of the rukh was brought by those messengers who were sent by the Grand Khan for the purpose of making inquiries respecting it which feather is positively affirmed to have measured ninety spans, and the quill part to have been two palms in circumference" The existence of this immense bird seems to have obtained universal credence throughout all the eastern nations and while ancient historians make mention of certain enormous and peculiar animals as common to the Orientals, scientific men of modern times have wisely omitted such relations from their nomenclature

### Note D, page 89

The only quadrupeds indigenous to New Zealand are a dog a small rat, a few Saurians a bat, and on the coast, one or two species of seal The dog (*Kuri**) is a small animal (somewhat resembling the variety known as the *pricked ear shepherd's cur*) with erect ears and flowing tail, its cry is a peculiar kind of whining howl which when in a state of domestication, it utters in concert at a signal given by its master, and is most unpleasant Of the skins of these animals the New Zealanders make a durable garment which when composed of alternate strips of black and white fur has a handsome appearance Its flesh was formerly eaten This variety of dog has however become very scarce in consequence of the continued introduction of other and larger varieties

The rat (*Kiore*) is a small field species of *Arvicola* Cuv, now seldom met with Its place unfortunately is more than supplied with the common species of *Mus* (*M musculus*, *M rattus*, and *M decumanus*†), which everywhere abound, to the infinite annoyance of the natives The indigenous species was used as an article of food by the New Zealanders, being when fat in high repute as a delicious *morceau*

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* The natives have several names for the dog in addition to that of *kuri*, such as *moimoi*, *kirehe*, *peropero*, and the general appellative of *kararehe* M Balbi, 'Introd à l Atlas,' p lxix, mentions *pero*, the New Zealand term for dog, as being derived from the Spanish *perro*, and as affording a proof that the animal was originally of foreign introduction, and obtained in comparatively recent times, the natives however invariably assert their always having had this animal among them

† These species are severally distinguished by the natives the indigenous animal is termed *kiore maori* (i e native rat), *M musculus*, *kiore iti* (i e little rat), *M rattus*, *kiore mangu* (i e black rat), or *kiore pakeha* (i e foreign rat), and *M decumanus*, *maunga rua* (i e barn abider)

Of the order *Sauria,* at least six distinct species are now in my possession They are all (with the exception of the *Tuatara* already mentioned) small animals Two beautiful species, one a light green with a long tail, the other a darker green with white oblong and subreniform spots, are called by the natives *Kakariki* and *Kakawariki* These are often found basking in the sun stretched on the upper branches of some shrub Two other species of an ash colour, elegantly marked with gray and brown waterings, called by the natives *Pàpà,* are found in rotten and hollow trees These four species are broad and flat and have small scales which are not imbricated Two other graceful species with bodies much narrower and more elongated, of a brown colour with numerous light and dark coloured markings and dots, are called by the natives *Mokomoko* One of these last-mentioned species is very common, and may be obtained in abundance in the summer season on the shores among the dry algæ and other light substances a few feet above high-water mark The other of these last-mentioned species is very scarce, I having only casually seen it in decayed trees in forests All the species are harmless and are objects of superstitious dread to the New Zealander, chiefly so however to the old and ignorant The flesh of the *Tuatara* alone is made use of by the natives as an article of food, only however by one or two tribes inhabiting the interior of the island, for which they have been often spoken contemptuously of by their countrymen

The bat I have never had an opportunity of closely examining It is however a small species, and like its European relative, is commonly seen flitting its tortuous maze on a fine summer's evening The natives call it *Pekapeka*

The seals (*Phocæ*) I have never seen, they are nevertheless, well-known to the natives, who call them *Kekeno,* and assert that they come on shore at night to browse on thistles! When captured, as they sometimes are they afford the New Zealander a rich repast They in all probability comprise the species *Ph leptonyx,* Blainv and *Ph leonina,* Linn

Pigs, dogs, cats, rats and mice are now both wild and numerous throughout the whole island Even the dense forests of the interior, far away from the residence of men, are infested with the smaller vermin The natives attribute the destruction and all but extinction of the Kiwi (*Apteryx australis*), the Koitareke (a species of *Tetrao*), the *'Weka* (a large and unknown bird with short wings, probably allied to the genus *Ardea*), the *Kiore maori,* and other terrestrial animals, to the voracity and numbers of those foreign pests

## Note E, page 91

It may not be amiss to give here an outline of the genera composing the family of *Struthionidæ,* seeing they are but few Each genus contains but a single species In the present state of our knowledge the group may be thus arranged —

Class AVES

Order IV Rasores, Vigors

Family IV Struthionidæ

1 Genus *Struthio*, Linnæus (Type of the group), *Ostrich* of South Africa possessing two toes
2 Genus *Casuarius*, Brisson *Cassowary* of the Indian Archipelago three toes
3 Genus *Dromiceius*, Vieillot *Emeu* of N S Wales three toes
4 —— *Rhea*, Vieill *Nandu* of Straits of Magellan three toes
5 —— *Didus* Linn *Dodo*, formerly an inhabitant of the Isles of Mauritius and Bourbon three toes extinct
6 Genus *Apteryx*, Shaw *Kiwi* of New Zealand three toes and a rudimentary one
7 —— ——? ——?[*] *Moa* of New Zealand three toes supposed to be extinct

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## XIII —*On some British species of* Œnanthe By Charles C Babington, M A, F L S, F G S &c[†]

My friend Mr Ball having most kindly allowed me to read his paper upon *Œnanthe* (p 4 of the present volume) before its publication, I have availed myself of his permission, and prepared the present memoir upon the same subject, which, it will be seen, is one which presents very considerable difficulty

To my valued friend the Rev W L P Garnons I am indebted for specimens of *Œnanthe* from "a marsh between Weymouth and Portland Island" which agree very well with Mr Ball's description of *Œ pimpinelloides*, but want the radical leaves All the stem leaves that remain (the lowest alone being wanting) have linear simple pinnules The diachenia are unripe, as is also unfortunately the case in all my foreign specimens of *Œ pimpinelloides*, but still they show a considerable difference of form from those of *Œ Lachenalii*, narrowing in a slight degree from the summit downwards, and being furnished at the base (as far as I can judge from unripe dried specimens) with the fleshy prominent ring found in the true *Œ pimpinelloides*, they are crowned with the erect persistent limb of the calyx, and about equal the length of the rigid, slightly divergent styles The leaflets of the involucels differ slightly in form and proportions, being linear-subulate or almost setaceous on one of the specimens from Mr Garnons, but linear-lanceolate on the other, and in both cases shorter than the outer barren pedicels On the Toulouse specimen of *Œ pimpinelloides*, gathered and named by M Serre, and already referred to by Mr Ball and myself (Man 130), the involucels have linear-subulate leaflets which are shorter than the outer pedicels, whilst on another from Dr Noe, found near Fiume (Reich Fl Germ exsic 1359), those organs are very narrow and extend beyond the barren florets I think therefore that the character drawn from the involucels can hardly be depended upon, and that the differences between this plant and *Œ Lachenalii* must be founded upon their very different roots, the remarkable callosity at the base of the diachenium, and the mucronate pinnules of all its leaves Owing to the absence of the radical leaves and of ripe fruit, I cannot absolutely say that the Weymouth plant is *Œ pimpinelloides*, although I have great reason to believe it to belong to that species Its root consists of long fibres abruptly enlarged at about two-thirds of their length into nearly spherical knobs Although these specimens must remain slightly doubtful, those which are referred to by Mr Ball seem to admit of no ambiguity, and will therefore add the true *Œ pimpinelloides* to the flora of Britain

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[*] Prof Owen's observations on this subject are given at p 444, vol xii, and p 59, vol xiv of this Journal, the generic name of *Dinornis* has been assigned by Prof Owen to this monster bird, and no less than five species distinguished —Ed

[†] Read before the Botanical Society of Edinburgh, 9th May, 1844

*Œ peucedanifolia* of Smith presents much more difficulty than we have met with in the consideration of the preceding plant, owing to the probability that more than one species is included under the name of *Œ silaifolia*, for its root keeps it distinct from the *Œ peucedanifolia* If we examine the works of authors of authority who have described plants under the name of *Œ silaifolia*, we find the following differing descriptions, viz "napulis radicalibus fasciculatis oblongis," *Bertoloni* (Fl Ital iii 241), "radice fasciculata fibris oblongo- vel elongato clavatis," and "fructibus cylindricis basi callo cinctis," *Koch* (Syn Fl Germ ed 2 322), "radicis fibris oblongo-fusiformibus tuberosis cylindricisve" and "fructibus ovatis," *DeCandolle* (Prodr iv 137), "radicis fibris cylindrico-fusiformibus," *Reichenbach* (Fl excurs 463), "radicis fibris cylindraceo-fusiformibus," *Bluff* and *Fingerhuth* (Comp Fl Germ ed 2 i 495), "tuberibus fusiformibus," *Bieberstein* (Fl Tauro-Cauc iii 232) Taking the last as the plant to which this name correctly belongs, we find the descriptions by DeCandolle, Reichenbach, and Bluff and Fingerhuth, and the figure in 'Eng Bot' (tab 348), to agree with it in the form of the thickened fibres of the root, but none of these authors give any useful description of the fruit except DeCandolle, who calls it "ovate," and as in other species he speaks of the callous ring at the base, it is clear that he does not understand it to be present in this plant It seems then that Smith's *Œ peuceda-*

*nifolia* must be referred to *Œ silaifolia* (Bieb ) until it can be shown that the fruit is different Owing to the want of authentic specimens of Bieberstein's plant, and of ripe fruit of Smith's, I am unable to do this, although it will be seen below that several authors consider it to possess a totally different form from that described by DeCandolle The descriptions published by Bertoloni and Koch remain to be considered, and it will be seen that they both describe the root in such a manner as to convey the idea of a quite different form of fibre from that possessed by the plant of Bieberstein , but that in their account of the fruit, totally different plants must be intended

I now come to the latest author who has written concerning these plants, namely Grisebach In his 'Spicilegium Floræ Rumelicæ et Bithynicæ' (i 352—357) he has described several new species of *Œnanthe*, and appended a tabular synopsis of all the European species belonging to the genus Here we find that *Œ media* (Griseb ) has "radicis napulis sessilibus oblongis utrinque attenuatis," and "fructibus cylindricis annulo calloso ad basin cinctis," and he afterwards adds, that it is "species media inter *Œ peucedanifoliam* (Poll ), quacum foliis et petalis convenit, et *Œ silaifoliam* (M B ), cujus fructum radicemque imitatur " Here then we have an express declaration that the true *Œ silaifolia* has roots similar to Sowerby's figure in 'Eng Bot ,' but that its fruit has the enlarged callous ring at the base

Concerning *Œ peucedanifolia* there is very little difference of opinion , most authors considering it to possess sessile, more or less clavate radical knobs, which contract abruptly into a long slender fibre, and fruits which are narrowed at the base

If now we refer to Mr Ball's description of his specimens named *Œ silaifolia* from Portmarnock and Deerhurst, we find that they possess oblong-clavate radical knobs terminating in a fibre—a structure which I consider to belong to the *Œ silaifolia* of Bertoloni and Koch, but not of Bieberstein, and the *Œ peucedanifolia* of most authors—but then he describes the fruit as "clavatum inferne quidquam contractum " In both these respects, therefore, it would appear that his plants might have been considered as the *Œ peucedanifolia,* had he not stated that all their leaves are similar, the leaflets of the lower leaves being lanceolate and of the upper ones linear, which I believe not to be the case in *Œ peucedanifolia* Thus his plant is not *Œ peucedanifolia* from its leaves, not *Œ silaifolia* of Bieberstein, DeCandolle, Reichenbach nor Bluff, from its root It is probably the plant of Bertoloni but not that of Koch, if "the presence or absence of the incrassated summit of the pedicel," by which I understand what most authors call the callous ring at the base of the fruit, "is never seen to vary "

I now proceed to notice two English plants contained in my own herbarium, but previously take the opportunity of suggesting that, as it is not improbable that the form of the radical knobs varies in different states of the same plant or at different seasons of the year, it would be advisable that they should always be examined at the same stage of the plant's development, namely, when the fruit of the primary umbel is well-formed but the secondary umbels still bear flowers One of my English specimens was gathered ten years since at Cambridge, and unfortunately does not possess the root or fruits, in other respects it agrees pretty well with Mr Ball's description of *Œ silaifolia,* although not quite with sufficient exactness to allow me to state with certainty that they are the same plant The other English specimens in my possession have been given to me by the Rev A Bloxam, by whom they were gathered at Sutton Wharf in Leicestershire These possess the roots of *Œ peucedanifolia*, the radical and lowest stem leaves are absent, but all the others have short, linear, acute segments, and the lower ones are bipinnate, whilst the upper are nearly, and the uppermost quite, simply pinnate Unfortunately the fruit is very young, but yet shows very decided marks of having a thickened base On the whole, I am inclined to consider all my English specimens as referable to the *Œ silaifolia* of Koch but not of Bieberstein

From the above it seems to me that we are authorized to conclude that more than one species passes under the name of *Œ peucedanifolia* of Smith, and I trust that I may venture to ask English botanists to favour me by the communication of specimens possessing both fruit and roots, in order to enable me to endeavour to clear up this difficulty in a future edition of my 'Manual of British Botany'

The root of *Œ Lachenalii,* which, as Mr Ball justly observes, is by far the most common of these plants in Britain, appears to differ considerably according to the state of the plant, young seedlings and the offsets of old plants having slender branched fibrous roots On flowering plants the fibres are simple, stout, and pretty uniformly thick throughout the greater part of their length, not clavate nor fusiform, nor nodulose The radical fibres of fruiting individuals usually thicken gradually, but not very greatly through a considerable portion of their length, and are then narrowed quickly, but not abruptly, into the slender fibrous extremity Old plants which, late in the autumn, have perfected their fruit and are dying down to the ground, have their radical fibres irregularly thickened throughout at least half of their length, not at all clavate, and too irregular to deserve the name of cylindrical or fusiform

I have but little objection to make to Mr Ball's description of

*Œ Lachenalii*, but find the lowest leaves to be occasionally even tripinnate, and the leaflets are quickly rounded off at the end to an acute angle I suspect that Mr Ball is not acquainted with the radical leaves of seedling plants or young offsets they are once or twice pinnate, with ovate or wedge-shaped, obtusely inciso-apiculato-crenate segments

It only now remains for me to add, that I fully concur with my friend in the observations with which he concludes his paper, but think that the position, form, and relative size of the radical knobs are of more value for the discrimination of species than they appear to possess in his estimation

St John's College, Cambridge, April 25, 1844

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## XIV —*On* Cardinia, *Agassiz, a Fossil Genus of Mollusca characteristic of the Lias* By H E Strickland, M A , F G S

There are few groups of fossils which, both in their generic and specific relations, have been involved in greater confusion than the very natural and characteristic genus of which I am about to speak Having resided for some years in a locality where several species of this genus abound, and having, by the examination of many hundreds, I might say thousands of specimens, aided by the kindness of Mr J Morris, author of the valuable 'Catalogue of British Fossils,' been enabled to trace them through their several varieties, and thus to circumscribe the boundaries of the species, I hope to correct some of the errors into which other authors have fallen

The genus of Mollusks in question is evidently most nearly allied to *Astarte*, Sow (*Crassina*, Lamarck), a genus which most authors agree in placing among the *Veneridæ* From the great strength of the shell, single valves are often preserved in a perfect state, and we are thus enabled to ascertain all its characters with an accuracy that is rarely attainable in fossil bivalves, especially of the older formations The genus may be described in general terms as an *Astarte* with the addition of very strong lateral teeth The shell is longitudinally oval, very thick, equivalve, inequilateral, perfectly closed, the hinge very strong, the right valve with two oblique converging cardinal teeth as in *Astarte*, but these teeth are flat, and only divided by a slight groove, which is sometimes obsolete Below these teeth and immediately behind the lunule is a depression extending in front of the anterior lateral tooth, with a corresponding elevation in the left valve, in which the true cardinal teeth are almost wholly obsolete Above the cardinal teeth in both valves is a deep narrow groove, evidently for the reception of an external ligament, as in

*Astarte* In front of the hinge is a deep and distinct lunule The lateral teeth are remote and very strong, the anterior one of the right valve obtusely conical, the posterior one of the left valve elongated, and both mutually entering deep pits in the opposite valves Umbones approximate Muscular impressions very deep, placed immediately below the lateral teeth, their surfaces smooth, the posterior impression round, the anterior one ovate Above the latter in both valves is a small oval detached muscular impression placed on the hinder surface of the lateral tooth, for the insertion of the retractor muscle of the foot Pallial impression entire, parallel to the margin, which is not crenated External surface of the shell more or less irregularly imbricated by the lines of growth The geographical distribution of this genus is as yet confined to Northern Europe, its geological range is from the base of the lias up to the inferior oolite

Several species of this genus were described by Sowerby in his 'Mineral Conchology,' under the genus *Unio* They differ however from the whole of the *Unionidæ* in many respects, especially in the want of the small accessory muscular impression *behind* the anterior one (which occurs in the *Unionidæ*, and to which a branch of the retractor muscle of the foot is attached), in the presence of the lunule, in the shell not being nacreous, and in the habitat having been marine, as is sufficiently proved by the other fossil animals whose remains invariably accompany these shells

M Goldfuss has been no more successful than Mr Sowerby in detecting the true generic relations of these shells, having in his 'Petrefacten' referred different species of them to the genera *Unio*, *Cytherea* and *Lucina*, without detecting the essential characters which distinguish them from all these genera

M Agassiz was the first to combine the different species of this group into one genus, though he failed to perceive that they are much more closely allied to the *Veneridæ* than to the *Unionidæ* To this genus he gave the name of *Cardinia* in a paper read to the Helvetic Society at their meeting at Basle in 1838, and in 1840 he published the characters of the genus in his translation of Sowerby's 'Mineral Conchology' In 1840 Mr J E Gray gave the name *Ginorga* to this genus in the 'Synopsis of the British Museum,' p 154, but this mere name, destitute alike of etymology and of definition, can have no claim for adoption In January 1841, M de Christol defined a genus *Sinemuria* in the 'Bulletin de la Societé Géologique de la France,' which from the characters assigned is evidently identical with the genus before us, though he errs in supposing the ligament to have been internal instead of external Lastly, in March 1842 Mr S Stutchbury described this group in great detail in the 'Annals of Natural History,' and bestowed on it the name of *Pachyodon*, a name which had been used four years before by M von Meyer for a genus of Mammals

It appears from this historical statement, that as M Agassiz was the first to publish the characters of the genus, so his generic name *Cardinia* must supersede all later ones

Some authors have been disposed to extend the geological range of this genus, by including in it those numerous species from the coal-measures which Sowerby and most other palæontologists have regarded as true *Unionidæ* Whether Agassiz originally proposed this extension of the genus I am not aware, having never yet been able to meet with his translation of the 'Mineral Conchology,' in which the group is first defined, but in his last work on the subject, the 'Etudes critiques sur les Mollusques Fossiles,' he seems to regard *Cardinia* as exclusively confined to the lias and lower oolite De Koninck however, in his 'Description des Animaux Fossiles du terrain houillier de la Belgique,' classes these coal-measure shells as *Cardiniæ*, and prefixes a definition of the genus which seems to be chiefly copied from De Christol's definition of *Sinemuria*, and we may therefore conclude that De Koninck had not been able to examine the *interior* of the fossils which he describes He seems to have made a compromise between the real characters of *Cardinia* and the erroneous statement of De Christol as to the *internal* ligament, for he says that the shell had *two* ligaments, one *internal* and the other *external*, a statement which I believe to be wholly incorrect

Capt Thomas Brown also seems to regard the coal-measure fossils as generically identical with the lias ones, since he has described, under Mr Stutchbury's name *Pachyodon*, no less than twenty-six species of shells from the coal-measures, which he has illustrated with very accurate figures in the 'Annals of Natural History' for Dec 1843, and in his own 'Fossil Conchology of Great Britain,' plate 73

There are however many reasons for regarding as doubtful the supposed affinity between the Unioniform shells of the coal-measures and the true *Cardiniæ* of the lias, although it must be admitted that there is much general resemblance in their external forms In the *first* place, I believe no author has yet seen or described the *interior* of any of the coal-measure shells, and there is consequently no positive evidence whatever as to the structure of their hinges *Secondly*, although the general characters of the muscular and pallial impressions, as exhibited by the casts in both these sets of species, are very similar, yet in the coal-measure shells the muscular impressions are much smaller and shallower than in those of the lias, and the lateral teeth, if present at all, are evidently much less developed *Thirdly*, in conformity with this greater feebleness of the connecting muscles, we find that the shells of the coal-measure fossils are much thinner and weaker than in those from the lias *Fourthly*, the shells from the coal-measures rarely exhibit any trace of a lunule, and when present it is more diffused and indistinct than in the liassic species *Lastly*, the *Cardiniæ* from the lias were wholly marine in their habits, while there are strong grounds for believing that the species from the coal-beds inhabited fresh, or at most brackish water This is shown by the fact that these *Unio*-like shells are almost invariably found in the beds of shale accompanying the coal, and not in the really marine formations of the same age Now whether we suppose the coal to have grown *in situ* like peat, or to have been washed by currents into certain localities (both which theories are no doubt true in certain cases), we cannot deny the coal to be a terrestrial production, and therefore when we find a particular family of mollusks constantly, and almost always exclusively, accompanying the beds of coal, we have a very strong presumption that these animals had a lacustrine or estuarine habitat

It is true that in some cases, as in Coalbrook Dale, at Halifax, at Glasgow, and in Belgium, the coal-measures contain an admixture of these bivalves with various marine genera, but this does not necessarily prove them to be marine species, for they may either (as suggested by Mr Prestwich in his memoir on Coalbrook Dale, 'Geol Proceedings,' vol ii p 405) have been washed down into an estuary and there become mixed with marine shells, or by a depression of the land the sea may have washed the marine shells into the marshes tenanted by these supposed freshwater species And it is important to remark, that in the carboniferous limestone, a strictly marine formation immediately preceding, and in some cases alternating with the coal-measures, these peculiar bivalves rarely if ever occur

For these reasons I think we ought to abstain from classing the shells of the coal-measures with the well-marked and clearly-defined genus *Cardinia* of the lias I do not indeed mean to assert that the carboniferous group of shells really belong to the *Unionidæ*, where they were formerly classed, for they want the supplementary anterior muscular impression which distinguishes that family*, but I think they may be for the present regarded as a distinct family, probably lacustrine, and possibly allied to *Unionidæ*, but the precise characters of which, and especially the structure of the hinge, are as yet unascertained Perhaps Dr Carpenter, whose researches on the microscopic structure of shells have opened to us a new element for the determination of fossil

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* Mr G B Sowerby, in his 'Genera of Recent and Fossil Shells,' states that he could find *no difference* between the casts from the coal measures and those which he made from the inside of recent *Unios*, but he had perhaps overlooked the supplementary muscle of the latter

Mollusca, may be able to throw further light on the affinities of these ambiguous yet characteristic fossils

Confining our attention therefore to the shells of the lias and lower oolite, we will proceed to examine the species of *Cardinia* which really exist in nature, as well as those which have been described in books

### I *Ascertained species of* Cardinia

#### 1 CARDINIA LISTERI, *Sow* (sp )

*Donax?* Park Org Rem pl 13 f 7
*Unio Listeri,* Sow Min Con pl 154 f 1 3 4
*Pachyodon Listeri,* Stutchb in Ann Nat Hist vol viii pl 9 f 1, 2

*Var* 1 Subelongate

*Cytherea latiplexa,* Goldf Petref pl 149 f 6
*Unio hybrida,* Sow Min Con pl 154 f 2
*Pachyodon hybridus,* Stutchb in Ann Nat Hist vol viii pl 9 f 3 4
*Cardinia hybrida* Agass Et Crit Moll pl 12

*Var* 2 Subcompressed

*Cytherea lamellosa,* Goldf Petref pl 149 f 8

*Var* 3 Lines of growth very numerous

*Pachyodon imbricatus* Stutchb in Ann Nat Hist vol viii pl 9 f 5, 6

*Var* 4 Small sized (probably young)

*Pachyodon cuneatus,* Stutchb in Ann Nat Hist vol viii pl 10 f 11 12

*Var* 5

*Cardinia amygdala,* Ag Et Crit Moll pl 12 f 10—12

Formation lower lias

Localities Whitby Yorkshire, Grantham, Langar, Nottinghamshire, Cropthorn, Defford and Eckington, Worcestershire, Frethern, Gloucestershire, Wurtemburg

In Worcestershire and Gloucestershire this species is very abundant in a zone of the lower lias, about 150 feet above the base of that formation Single valves are frequent It is subject to much variation in the thickness of the shell, the frequency and regularity of the imbrications, and the length or shortness of the posterior extremity Having examined a very extensive series of specimens, I have little doubt of the correctness of the above synonyms

#### 2 CARDINIA CRASSISSIMA, *Sow* (sp )

*Unio crassissima,* Sow Min Col pl 153
*Pachyodon crassissimus* Stutchb in Ann Nat Hist vol viii pl 9 f 7

Lower oolite Dundry, Wick near Bath
Marlstone Dumbleton, Worcestershire

### 3 CARDINIA CRASSIUSCULA, *Sow* (sp )

*Unio crassiusculus*, Sow Min Con pl 185 , Zieten, Verst Wurt pl 60 f 1

*Pachyodon crassiusculus*, Stutchb in Ann Nat Hist vol viii pl 9 f 8

*Pullastra antiqua*, Phill Geol Yorksh pl 13 f 16

*Var* 1 Small sized, perhaps young

*Cardinia elliptica*, Ag Et Crit Moll pl 12 f 16, 17

*Var* 2

*Cardinia similis*, Ag Et Crit Moll pl 12 f 23

Formation lias

Localities Pocklington and Robin Hood's Bay, Yorkshire, Nottinghamshire Gloucestershire, Somersetshire

Wurtemburg, Stuttgard Var 1 Argovie var 2 Soleure

After a careful comparison of specimens, I have little doubt of the specific identity of the above references

### 4 CARDINIA LANCEOLATA, *Stutchb* (sp )

*Pachyodon lanceolatus*, Stutchb in Ann Nat Hist vol viii p 484

Formation lower lias

Locality Robin Hood s Bay, Yorkshire

The figure intended for this species by M Agassiz was taken from a specimen of *C attenuata* which I sent him

### 5 CARDINIA ATTENUATA, *Stutchb* (sp )

*Pachyodon attenuatus*, Stutchb in Ann Nat Hist vol viii pl 10 f 13, 14

*Cardinia lanceolata* Ag Et Crit Moll pl 12″ f 1—3

Formation top of lower lias just below the marlstone

Localities Hewlets near Cheltenham, Bourton-on-the-Water, Gloucestershire

M Agassiz's figure above-quoted is taken from a specimen which I sent him, and I am therefore satisfied that it belongs to the present species

### 6 CARDINIA CONCINNA, *Sow* (sp )

*Unio concinnus*, Sow Min Con pl 223 f 1, 2, Zieten, Verst Wurt pl 60 f 2 to 5, Goldf Petref pl 132 f 2, Bronn, Lethæa Geogn p 361

*Pachyodon concinnus*, Stutchb in Ann Nat Hist vol viii pl 10 f 15, 16

*Cardinia concinna*, Ag Et Crit Moll pl 12 f 21, 22

Formations marlstone and lias

Localities Yorkshire, Langar, Nottinghamshire, Daventry, Northamptonshire, Saltford and Weston near Bath, Wurtemberg, Fachsenfeld, Mogglingen, Staffelegg in Argau

This is the largest species of the genus I have a specimen from the marlstone of Byfield in Northamptonshire which is 5½ inches long by 3 inches broad

### 7 Cardinia ovalis, *Stutchb* (sp )

*Lucina lævis*, Goldf Petref pl 146 f 11
*Pachyodon ovalis*, Stutchb in Ann Nat Hist vol viii pl 10 f 17, 18, 19
*Cardinia unionides*, Ag Et Crit Moll pl 12'' f 7—9

*Var* 1

*C cyprina*, Ag Et Crit Moll pl 12'' f 4—6
Formation lower lias
Localities Dunhamstead and Coltknap hill Worcestershire Ashleworth and Frethern, Gloucestershire, Watchet, Somersetshire, Blumenroth, Coburg

M Goldfuss's specific name *lævis* is prior to the other two, but as it is founded on an erroneous identification with the *Corbis lævis* of Sowerby, which is a very different shell, I retain Mr Stutchbury's name *ovalis* The two supposed species figured by M Agassiz are both founded on specimens which I sent to that learned naturalist myself, and I am therefore able to identify them positively with the present species In Worcestershire this fossil abounds about 100 feet above the base of the lower lias Single valves are very rare

### 8 Cardinia sulcata *Ag*

*Cardinia sulcata* Ag Et Crit Moll pl 12 f 1—9
Formation "Calcaire à Gryphites"
Locality Soleure

Judging from the figure and description, the above seems to be a distinct species

### 9 Cardinia aptychus *Goldf* (sp )

*Cytherea aptychus* Goldf Petref pl 149 f 7
Formation lias
Locality Amberg

I have seen and examined specimens of all the above species except nos 8 and 9

## II *Species referable to this genus, but whose specific characters require further investigation*

1 *Pachyodon abductus* Stutchb in Ann Nat Hist vol viii pl 9 f 9, 10

I think this is probably one of the numerous varieties of *C Listeri* I agree with M Agassiz that it is not the *Unio abductus* of Phillips

2 *Cardinia oblonga*, Ag Et Crit Moll pl 12 f 13—15

From the lower oolite of Normandy Described *from a cast,* an authority on which it must be very unsafe to found *specific* distinctions

3 *Cardinia lævis*, Ag Et Crit Moll pl 12″ f 13—15

From Mulhausen It is not the *Lucina lævis* of Goldfuss Perhaps a variety of *C Listeri* or *crassiuscula*

4 *Cardinia securiformis*, Ag Et Crit Moll pl 12″ f 16—18

From Soleure, described from a cast, and perhaps only a variety of *C concinna*

5 *Sinemuria Dufrenii*, De Christol, Bullet Soc Géol de la France, Jan 11, 1841

From "fer oligiste" of Semur It is impossible to say, from the brief description given, whether this shell be a distinct species or not

6 *Unio depressus*, Zieten Verst Wurt pl 61 f 1

From Degerloch near Stuttgard Probably referable to variety 1 of *C Listeri*

### III *Species apparently referable to other genera*

1 *Venulites trigonellaris* Schloth Petref p 198 *Cytherea trigonellaris*, Goldf Petref pl 149 f 5

From the lias of Alsace, perhaps not a *Cardinia*

2 *Unio abductus*, Phillips Geol of Yorksh pl 11 f 42

From inferior oolite of Glaizedale Possibly a *Cardinia*, but M Agassiz regards it as a *Gresslya*

3 *Cardinia quadrata*, Ag Et Crit Moll pl 12″ f 10—12

From lias of Lower Rhine The above figure appears to represent an *Astarte*, and much resembles *A lurida*, Sow

4 *Unio Listeri* Goldf Petref pl 132 f 1

This seems to be the *Amphidesma donaciforme* or *rotundatum* of Phillips, and belongs to the genus *Gresslya*, Agassiz

5 *Unio uniformis*, Sow Min Con pl 33 f 4

6 *Unio acuta*, Sow Min Con pl 33 f 5 6 7

The last two species, said by Sowerby to be from the middle oolite, are referred to *Cardinia* by Agassiz, in his translation of the 'Mineral Conchology'

7 *Pachyodon hamatus*, Brown in Ann Nat Hist vol xi pl 16 f 6

From Oxford clay of Gristhorpe Bay, and certainly not a *Cardinia*

8 *Pachyodon vetustus*, Brown in Ann Nat Hist vol xi pl 16 f 7

From shale at Gristhorpe Bay, and probably not a *Cardinia*

9 *Unio striatus,* Goldf Petref pl 132 f 3

From coral rag, Nattheim

10, *Unio liasinus,* Zieten, Verst Wurt pl 61 f 2, Bronn, Lethæa Geogn pl 19 f 17

From Fildres near Stuttgard This is evidently a *Gresslya,* allied to *Amphidesma rotundatum,* Phillips

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## XV —*On the Marine Algæ of the vicinity of Aberdeen* By G Dickie, M D, Lecturer on Botany in the University and King's College of Aberdeen*

[Continued from vol xiii p 335]

[With a Plate ]

Previous to entering on the remaining species of the olive-coloured Algæ found in this vicinity, it will be necessary to direct attention to the difference usually understood between the reproductive bodies called *spores* and *sporidia*

The remarks already made on the *acrosperms* (*sporidia*) of *Fucus,* &c, and the accompanying figures, will sufficiently explain their structure, it must be observed, that up to the time of maturity they are enclosed in cells (*asci*), from which, when ripe, they are readily emitted It is more than probable, however, that there are instances in which there is an intimate adhesion between the sporidia and their asci, so that both drop off together

The observations recorded in the first part of this communication, on the development of the seeds of *Fucus serratus,* will explain the nature of *spores*, the latter are not necessarily enclosed in cells up to the time of maturity, but usually become free

A difference exists in many Algæ between the appearance of the contents of the *spores* and *sporidia* in the latter, the granular matter has a tendency to cohere in masses, which often assume a definite arrangement, the contents of the *spores* are more abundant, so much so that these bodies are generally dark-coloured and almost opake,—hence the expression *Melanospermeæ,* and the granular matter probably never (?) assumes a definite arrangement

### Sporochnoideæ

*Desmarestia ligulata,* Lamour —This species appears to be of rare occurrence, strictly confined to deep water, and only found cast up after storms The first specimens were found by Dr Andrew Fleming in October last, on the beach near Don mouth, after a gale, and a few days subsequently I found some very large examples near the mouth of the Dee

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* Read before the Botanical Society of Edinburgh, 11th April 1844

*D aculeata*, Lamour —Is very abundant, and, like the former, an inhabitant mostly of deep water, on one occasion only have I seen it *in situ* at low-water mark

Owing to the localities in which these species grow, no opportunity has been afforded of procuring them at different seasons in states favourable for microscopic examination The fructification has by some been supposed to be connected with the pencils of filaments which are plentifully produced The structure of these filaments differs essentially from that of the simple or branched filaments which usually accompany the *spores* and *sporidia* in other Algæ, in *Desmarestia* they are generally flattened, being composed of several slices of cells on the same plane, and often appear like fronds in miniature It is by no means improbable that they afford one way by which the plants are propagated The very fact that these filaments (miniature fronds ?) are so copiously produced, may be the very reason that neither true *spores* nor *sporidia* have hitherto been found Among Phænogamous plants there are examples of what may be an analogous mode of reproduction, as in *Saxifraga foliolosa*, Br , of the Arctic regions, and others, in mosses, as *Macromitrium Leprieurii*, Montagne The same is no doubt true of some Lichens, and why not also of Algæ ?

Mr Lyell has presented me with specimens of *D aculeata* picked up on the beach of Cockburn Island, lat 64° 12′ S in this desolate region the temperature may be unfavourable to the development of true fructification, and the viviparous (?) mode alluded to may be legitimately inferred

From the structure of the frond in our two species of *Desmarestia*, I should be inclined to predict that the fructification, when detected, will be found to consist of *spores*

## DICTYOTEÆ

*Padina Pavonia*, Lamour —This beautiful plant is stated, in Dr Greville's 'Algæ,' and in Sir W J Hooker's 'Flora,' to have been found at Aberdeen The statement, I believe, was first made by Lightfoot, on the authority of Dr Cargill, I have often searched for it, but in vain

*Dictyosiphon fœniculaceus*, Grev —It occurs in pools between high- and low-water mark, but nearer the former, in great profusion and of large size It may be reckoned among the most common species The fructification is stated, in 'Harvey's Manual,' to be rare, I have found it not unfrequently, but only on distorted specimens, not exceeding three or four inches in length

*Punctaria plantaginea*, Grev —Is not uncommon in summer in pools near high-water mark

*Asperococcus echinatus*, Grev —Not uncommon along with the former

*A pusillus*, Hook —A plant corresponding to the description usually given, and resembling in structure authentic specimens sent me by Mr Thompson of Belfast, occurs here, though rarely, it is usually parasitical on *Polysiphonia nigrescens*, but very small

*Chorda lomentaria*, Grev —Not unfrequent in pools near high-water mark

*C filum*, Lamour —This species, so common on many parts of the British coast, and attaining so great a size as that mentioned in the 'Algæ Britannicæ,' is comparatively a rare plant in this vicinity, occurring only in deep pools at high-water mark, and seldom exceeding two feet in length I have seen it in the small harbour of Stonehaven attached to stones imbedded in mud, and attaining a greater size than at Aberdeen Dr Greville describes the fructification as consisting of "external masses of pear-shaped seeds fixed by their base," and gives a figure of these, he however alludes to a second kind, composed of "sessile ovate capsules scattered among clavate articulated filaments," discovered by Captain Carmichael and figured in 'Flora Londinensis' The bodies described and figured in the 'Algæ Britannicæ' constitute merely the cortical tissue of the plant, the true fruit, consisting of *asci* and *sporidia*, is imbedded in that tissue, and probably identical with the bodies seen by Carmichael and represented in the 'Flora Londinensis,' which I have no opportunity of consulting I consider it unnecessary to give any representation of this true fructification, since it exactly resembles that of *Alaria* and *Laminaria* already figured

### ECTOCARPEÆ

*Cladostephus verticillatus*, Lyngb, and *C spongiosus*, Ag, are both not uncommon in pools within high-water mark

*Sphacelaria plumosa*, Lyngb —Is one of the rarest of our olive-coloured Algæ, only a few small plants, not exceeding an inch in height, have been found in pools within high-water mark

*S cirrhosa*, Ag —At least two of the varieties of this species occur abundantly in pools

*S olivacea*, Ag —Appears to be rather local, it occurs on perpendicular faces of rocks near low-water mark

*Ectocarpus littoralis*, Lyngb —Is very common on the coast, and found abundantly about the mouths of the Dee and Don, it passes more than a mile up the former river, and often grows luxuriantly in places where at low-tide it is freely exposed to a strong current of fresh water

*E siliculosus,* Lyngb —Very common in pools near high-water mark

*E Hincksiæ* —This species, of which, as stated in his 'Manual,' Mr Harvey had only seen one specimen, is very abundant on the fronds of *Laminaria digitata;* and sometimes on *Rhodomenia palmata,* in the latter end of April and in May It appears to be a very distinct species

*E tomentosus,* Lyngb —Very common on different species of *Fucus* near low-water mark

*E granulosus,* Ag —Parasitical on other Algæ in pools near high-water mark, but rare

*E sphærophorus,* Carm —In June 1843 this species was found abundantly, parasitical on one of the most abundant of our *Rhodospermeæ,* viz *Callithamnion spongiosum* It bears fruit copiously, and never exceeds, in this vicinity, an inch in height, and usually is much less

*Myriotrichia filiformis* —Is not unfrequent in pools at high-water mark, attached to small specimens of *Chorda lomentaria*

### CHORDARIEÆ

*Chordaria flagelliformis,* Ag —Is very abundant and generally distributed The fructification, according to Turner, consists of "oblong or pyriform seeds lying among the concentrical filaments" I have not been able hitherto clearly to ascertain the true structure of the fructification in this species, but should, from analogy, infer it to consist of *spores*

*Helminthocladia virescens* —Is in some seasons very abundant on rocks about half way between high- and low-water marks, and straggling specimens occur in pools at the latter

*Corynephora marina,* Ag —This remarkable plant is plentiful in summer, attached to other Algæ and corallines In Harvey's 'Manual' a passage is quoted from Carmichael in reference to its fructification, the term "sporidia" being made use of it ought to be "spores"

In the first part of this communication it was stated that "the coast here is much exposed to the action of heavy seas, and presents few sheltered coves or even calm pools of any extent, and hence probably we may account for the absence of some of the more delicate species," it must not, however, be inferred that this is the only reason why certain Algæ are entirely absent from our coast, the influence of temperature must be far greater At least two other species may yet be expected to be found, viz *Laminaria bulbosa* and *Dichloria viridis*, the former being of such general occurrence on the British coasts, and the latter having been seen in the Moray Frith

Scarcely one-half of the Melanospermous Algæ enumerated in

Harvey's 'Manual' as occurring in Britain are found here, the proportions will be best seen from the following tabular view.

| | Aberdeen | Britain |
|---|---|---|
| Fucoideæ | 7 | 16 |
| Lichineæ | 1 | 2 |
| Laminarieæ | 3 | 7 |
| Sporochnoideæ | 2 | 7 |
| Dictyoteæ | 6 | 18 |
| Ectocarpeæ | 12 | 25 |
| Chordarieæ | 3 | 5 |
| Total number of species | 34 | 80 |

Among the *Fucoideæ* the total absence of *Cystoseira* will be observed, and scarcely one-half of the British species occur, of *Laminarieæ* scarcely one-half, of *Sporochnoideæ* only one-third, the two species of *Desmarestia* being generally distributed in Britain. There is also a great deficiency in the *Dictyoteæ*, *Cutleria*, *Halyseris*, *Padina*, *Dictyota* and *Striaria* being totally absent. Of *Ectocarpeæ* about one-half of the British species are found, and three out of five *Chordarieæ*.

It is proposed at an early opportunity to communicate observations similar to the present on the *Rhodospermeæ* of this coast.

The results obtained from careful dissections of the fructification of our *Melanospermeæ* have led to similar examinations of species from other parts of Britain, of which I possess and have only seen dried specimens. These may now be recorded, allowance being necessary for the disadvantageous circumstances under which the dissections have been made.

*Dichloria viridis*, Grev.—On this plant Dr Greville states that he has seen no pencils of filaments. On a dried specimen received through the liberality of Mrs Griffiths they certainly are present, it also appears to have nearly the same structure as *Desmarestia*, and not such as is represented in the 'Algæ Britannicæ', drying and pressure have, however, probably produced some change. If pencils of filaments (miniature fronds?) are usually produced by it, the remarks already made in reference to *Desmarestia* will also be applicable here.

*Sporochnus pedunculatus*, Ag.—Described in Harvey's 'Manual' thus "Fructification club-shaped moniliform filaments, radiating in scattered warts or concentrical in distinct (mostly clavate, stalked) receptacles, often terminated by a deciduous tuft of filaments." The clavate receptacles consist of a central tissue continuous with the short stem, and a cortical, composed of branched filaments placed perpendicularly to the former, and concrete. The pencils of filaments consist of the free ends of the central fibrous tissue. The cortical part (branched filaments) contains distinct *asci* and *sporidia*, these were very evident in a fragment of an Irish specimen sent me by Mr. Thompson of Belfast. To observe this structure, it is best to employ pressure in a drop of sea-water; the *asci* and *sporidia* are very minute. See Plate II. figs. 1, 2, 3.

*Sporochnus rhizodes*, Ag.—Having only examined dried specimens of this species, it is with much diffidence that I venture to describe its fructification as differing essentially from that of the last, and consequently requiring to be removed from the same genus. Those who may have opportunities of examining fresh specimens in different stages can alone be entitled finally to decide this question.

The warts are composed of moniliform simple filaments, at the bases of which pear-shaped *spores* will be seen nestling. The resemblance to the fructification of *Asperococcus echinatus* (and probably also to that of *Chordaria flagelliformis*) is most striking. Figs. 4 & 5 represent the structure described.

*Elaionema villosum*, Berk.—The fructification of this plant was first pointed out by the Rev. M. J. Berkeley, and a figure given in the 'Gleanings of British Algæ.' The structure seen in dried specimens is represented at Pl. II. fig. 7, and differing somewhat from Mr. Berkeley's representation. In fig. 6 is shown the fructification at an early stage; the *asci*, enclosing several *sporidia*, are at that time distinct. I believe, that in a more advanced stage an adhesion takes place between the *asci* and enclosed *sporidia*, fig. 8.

The results above stated have prompted the following "Suggestions towards an Arrangement of the British *Melanospermeæ*."

### 1. MELANOSPERMEÆ.

Spores and sporidia on the same or on different plants, and in the same or in different conceptacles.

a. *Heterospermeæ.*
Cystoseira
Halidrys
Fucus
Himanthalia
b. *Sporiferæ.*
Halyseris
Padina
Dictyota
Punctaria
Striaria
Asperococcus
Dictyosiphon
—
Sporochnus (rhizodes)
Chordaria
Myriotrichia
Helminthocladia
Corynephora
—
Cladostephus
Lichina
Sphacelaria
Ectocarpus
?
Desmarestia
Dichloria
c. *Sporidiferæ.*
Alaria
Laminaria
Cutleria
—
Chorda
Sporochnus (pedunculatus)
Elaionema

From an examination of *Cystoseira* under very unfavourable circumstances; viz of dried specimens, and the fruit probably immature, I am inclined to believe that spores and sporidia occur in the same conceptacles There is some reason to believe that the same arrangement prevails in *Halidrys*

In the *Sporiferæ* other subdivisions suggest themselves in some the spores are erumpent, breaking out beneath the cuticle as in *Padina*, in others, as *Striaria*, the spores are unaccompanied by filaments, and *Asperococcus* may be cited where the spores are so accompanied Should *Desmarestia* and *Dichloria* be found sporiferous, they will be properly placed beside *Halyseris*

In *Sporidiferæ*, as in *Sporifera*, there occur membranous and filamentous species

A question may arise as to the relative importance of spores and sporidia, there cannot be a doubt that both are equally capable of propagating the species

The above can only be considered an imperfect attempt, a mere outline or suggestion, those who possess a thorough knowledge of foreign as well as British species are alone entitled to speak with confidence on the subject, and to such knowledge the author of this attempt can lay no claim, and must leave his suggestions to be added to and amended by more experienced algologists

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## XVI —*Further Observations on the Ornithology of the neighbourhood of Calcutta* By EDWARD BLYTH, Curator to the Museum of the Asiatic Society of Bengal *With Notes by* H E STRICKLAND, M A

[Concluded from p 18 ]

No 127 (vol xii p 165 *supra*) I observed great numbers of *Hirundo rustica* a few weeks ago skimming over the salt-water lake a little above Calcutta

No 127 *a Hirundo daurica* (*erythropygia*, Sykes) was observed in considerable numbers in the middle of April upon the Calcutta esplanade

No 128 This is also the *M dukhunensis* of Sykes I observe that the *M picata* of Franklin, which is the *M variegata* Latham, is mentioned as having been received from Calcutta in the 'Rev Zool par la Soc Cuv 1839 pp 40 and 138 (this being the only volume of the useful work in question which I have for reference), but I have never heard of the species being obtained in this neighbourhood having only received it from Central and Southern India

No 130 This remarkable species, which is the type of my genus *Nemoricola*, is the *Bergeronette grise des Indes* of Sonnerat, upon which Latham founds his *Motacilla indica* I obtained one beautiful specimen during last cold season

No 130 *a b* The genus *Budytes* was strangely omitted in my catalogue though two species are common *B citreola*, which is less abundant, and of which I have one example with a jetty-black back, and *B beema* Sykes, which is extremely common, and approximates the *B neglecta*, Gould The sexes of this bird appear to assemble in separate flocks, at least I have two or three times vainly sought to pick out a female from among a flock of males, and I think that I have also observed a flock of females only The note of this bird is much weaker and less articulate than that of *B flava* of Britain The young males assume yellow under-parts in February and March and a dull leaden-blue cap and nape, having a strongly defined whitish supercilium, in old males the under parts are much brighter yellow, and the head and nape are fine dark ashy-gray with no trace of supercilium the throat continuing white at all ages spreading laterally to contrast with the dark ear-coverts A black cap I have never seen though Mr Jerdon includes *B melanocephala* among the species of Southern India and doubts its distinctness from *B beema*, which he identifies with *B neglecta* See also Mr Drummond s remarks on the species of the Ionian Islands vol xii p 416 *ante* Specimens with the supercilium slightly developed or with only a trace of it are also here common *

Of *Anthi* I have an extensive series of Indian species, but have obtained no additional ones in this vicinity

No 134 This lark I heard singing delightfully, soaring over the dry rice-stubble along the banks of the river during a late excursion, its song and mode of delivery closely resembling that of the British skylark No 135 appears to be identical with *A gulgula*, apud Jerdon and I have not obtained a second example of it in this part I have also a very extensive series of Indian larks and *Mirafræ* to describe as soon as I can get leisure to do so

No 139 is also *Alauda gingica* of Latham, after Sonnerat

No 141 I observed a large flock of this species during my late excursion, feeding upon the seeds of the reeds &c which choke up the moat surrounding the old fort at Budge Budge a most capital locale for the researches of the ornithologist

No 142 I have now obtained wild specimens of *Euplectes striatus*, which I had previously procured only in the bird shops†

No 145 *Spermestes malacca* auct

No 149 For a monographic notice of the species of *Phyllornis*, v *Chloropsis*, vide J A S B no 59 p 955 *et seq* I cannot just now enlighten Mr Strickland on the subject of the structure of these birds further than by remarking that the species with a curved and pointed bill have also a meliphagous conformation of tongue, by means of which, when caged they will sip at sweets, but they require to be fed on the usual diet given to insectivorous birds Vide Tickell's list for a slight notice of their habits *

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* The species of *Budytes* are as yet by no means satisfactorily made out It appears clear however that the gray-headed species of India and Malasia (*Motacilla bistrigata*, Raffles) is the same with the *cinereocapilla* of Southern Europe The young of this in Europe has a *yellow* superciliary streak, and I have a similar specimen from India It appears from Mr Blyth's account that the Indian bird with a *white* supercilium (*B beema*, Sykes) is also the young of the *bistrigata*, and if this be certainly the case, the true *B flava* of North Europe (*B neglecta*, Gould) must be distinct, as the gray-headed birds without a white supercilium are never found in the North of Europe —H E S

† *E striatus*, Blyth, seems to be the *F flaviceps*, Swainson, 'Animals in Menageries, p 310 —H E S

No 153 *Dicæum Tickelliæ* has a pale flesh coloured bill with dusky tip Vide J A S B no 59 n s p 983†

Nos 154 and 155 My *Vinago militaris* is the species so designated by Gould, having an ash-coloured belly, and which abounds in Bengal and Nepal That of Southern India *V* (or *Treron*) *chlorigaster*, nobis I have once only obtained in this part and have received specimens of it from Mr Jerdon and others I cannot recognise, however the difference of size and structure of bill mentioned by Mr Strickland ‡, the only distinctions consisting in the green or yellowish-green belly of *Tr chlorigaster*, the absence of this colour on the basal half of the tail and there is also at most but a faint trace of the same hue upon the forehead *Tr bicinctus* of India generally and also Aracan differs from *Tr vernans* of the Malay countries in having the forehead to beyond the eyes the throat and sides of the neck bright green the occiput alone gray and the pinkish lilac hue surmounting the orange colour of the breast diminished in quantity and not spreading to the sides of the neck while in *Tr vernans* it quite surrounds the neck, the tail also is broadly tipped with ash-colour, appearing as ashy-white beneath this character serving at once to distinguish the females while the female *Tr aromatica* may be known from that of *Tr bicinctus* by its ash-coloured forehead

The *Sphenocercus* (G R Gray) *cantillans* nobis, J A S B xii 166, is said to occur in the Soonderbuns though I rather doubt it, as the group to which it belongs appears to be monticolous The *Sph oxyurus,* in addition to *Sph sphenurus,* inhabits Bengal and Assam

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* Having lately procured specimens of *Phyllornis* in which the tongue is preserved, I am now satisfied that they belong to the *Tenuirostres* and not to the *Pycnonotinæ* —H E S

† There can now be no doubt that *Dicæum Tickelliæ* is the *Certhia erythrorhyncha* of Latham, and the latter specific name should be adopted —H E S

‡ This was owing to my having (at p 38, *supra*) assumed as the true *militaris* a Malayan bird which now appears to be distinct and undescribed It is the largest species of *Treron* known, with the beak very strong and almost *Vulturine* in form Total length 14 inches, beak to gape 1 inch 4 lines, height 5½ lines, wing 7¾ inches, medial rectrices 5 inches, external 4½ My specimens are wholly greenish-gray above, greater covers and quills slaty-black, the middle covers and tertials margined externally with bright yellow, four medial rectrices greenish-gray, the rest slate-coloured tinged with green, and broadly tipped with light gray Below pale grayish-green, a large patch on the breast of dull orange Lower tail covers chocolate (in a younger specimen gray, tipped with buff), beak plumbeous, pale yellow towards the end, legs flesh-colour This species may be called *Treron magnirostris* The true *militaris* of Temminck and Gould, which is the *phœnicoptera* of Latham, inhabits Northern India, as shown by Mr Blyth, and the *chlorigaster*, Blyth (which name is prior to mine of *Treron Jerdoni*), occurs in the South of India —H E S

Respecting the *Columba risoria* group, I consider that I have three distinct species before me —1 that so commonly kept in cages, both here and in Europe, and which I presume is the North African species, of a pale isabelline colour, 2 the South African *Turtur vinaceus*, and 3 that common throughout India, with bluish gray wings and tail and altogether more resembling no 2, but having the general hue paler the under-parts much paler, and no dusky tinge upon the rump its note or coo also differing from that of no 1 I am not acquainted with the two varieties of size mentioned by Major Franklin, but the Bengal species measures 12¾ to 13 inches long by 19½ to 20 in in alar extent wing from bend 6⅜ to 6⅝ in and middle tail feathers 5⅛ to 5⅜ in *

No 161 I am not satisfied that Mr Strickland is correct in regarding the wild pigeons which I mentioned as being brought somewhat abundantly to the London markets as the young of *C livia* The bird I alluded to is well known to Mr Bartlett who could procure any number of specimens, and it is remarkable that individuals with barred wings appear never to occur among them It is not improbably the blue rockier pigeon noticed by Gilbert White

No 163 This is the *Perdix gularis* of Temminck and *Chickore* of Bengal sportsmen, so termed from its call, which much resembles that of the red-legged *P chukar* of the Himalaya It abounds in all the heavy jungles eastward of the Ganges, extending northward to the Malda range of hills, if not beyond

The *Francolinus* or *Perdix lunulatus* of Valenciennes is evidently identical with the Curria partridge of Hardwicke, termed *F Hardwickii* by Gray and recently *F nivosus* in the Mag de Zoologie' It comes chiefly from the country westward of Agra and Mr Jerdon has also recently obtained it in the south but an experienced sportsman assures me that he doubts exceedingly the existence of this bird in Bengal, though I observe that a double spurred partridge is mentioned to occur in the Monghyr district which I must inquire about

No 166 *Coturnix coromandelica* is I am told, very abundant during the rains, at which season it breeds

No 168 This I now consider must have been the young of *Coturnix chinensis*

Nos 169 and 170 Mr Jerdon has now ascertained, for certain that the *Hemipodius taigoor* of Sykes is the male of his *H pugnax* the latter only having the black stripe down the throat and breast, besides being larger This corresponds with what I have also observed of its Bengal representative, which appears always to be somewhat smaller than that of Southern India, and decidedly less rufous from Nepal I have received a third closely-allied species, the *H atrogularis* of Eyton, but which will bear the prior name of *plumbipes*, Hodgson, published in 1837, and which abounds in the Tenasserim provinces, and also in the vicinity of Singapore  There are two other Bengal species, additional also to *Dussumieri*, one of them the *Turnix tanki* of Buchanan which likewise inhabits Nepal, and the other undescribed, which Mr Jerdon has also obtained in the south  I believe that he has yet another Indian species of this group collected by Lord Arthur Hay

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* The pale turtle-dove kept in cages is a domestic variety unknown in a wild state The North African bird is the same as the Indian, it is the true *Turtur risorius*, Linn (sp), and differs from *T vinaceus* of S Africa in having the lower wing covers light and the lower tail covers dark, while in *T vinaceus* they are the reverse —H E S

No 171 *a*  Add *Gallus bankiva* brought to me fresh from the vicinity

No 173 *et seq*  Herons Bitterns, &c  Add *Ardea nobilis*, nobis, and *Botaurus sinensis* (*Ardea sinensis* Lath , and *A lepida*, Horsf ), I have also obtained two other specimens of *Botaurus stellaris* and likewise the *B flavicollis* (*Ardea flavicollis*, Lath , and *A nigra*, Vieillot)

The Indian white Egrets are difficult to understand  There are three sizes of them, of which the smallest is the common *A garzetta*, which is very abundant  The *A orientalis* of Hardwicke's published drawings may, I suspect be safely referred to this species, although the beak is represented to be wholly black, and the toes are coloured much too orange instead of greenish yellow  This species always sheds its crest prior to dropping its dorsal plumes and the colour of its toes, contrasting with its black tars  at once distinguishes it

The large white Egrets have at all ages, the bill sometimes orange yellow sometimes wholly black and sometimes the basal part of the bill is yellow and its terminal part black varying in proportions  In one fine adult before me, with a fully developed train the bill is about half yellow and half black, in another there is a yellowish ring only near the base and I have observed the same differences in birds of the first year  The yellow billed specimens constitute the *A flavirostris* Wagler, and the black-billed are probably the *A modesta* Gray though I have never seen the train elongated as in Hardwicke's figure*

Of the third size which is intermediate, I once had several dozens of the young brought me, all of which had yellow bills, slightly tipped with dusky black  what few adults (with dorsal trains) I have seen had the bill wholly yellow with one exception only wherein the terminal two-thirds are black  and the *A nigrirostris* of Hardwicke and Gray appears to represent a specimen with bill wholly black  In the Egrets of this size, the wings measure 11 or 11½ inches in length bill to forehead 3 in  tarsi 4½ in , the claws straighter and more elongated than in the great Egrets  The yellow-billed specimens constitute the *A putea* Buch Hamilton MS

The members of this group are now putting forth their nuptial dress, and I trust this season to come to some distinct understanding of the variations here noticed

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* What are the measurements of these large Indian Egrets? and do all the varieties referred to present the same dimensions? The Egrets of Southern Europe are almost as puzzling as those of India, and we shall look with interest for any light which Mr Blyth can throw upon them — H E S

No 188 I did not observe a single specimen of this 'Adjutant during the last period of the sojourn of the common great species

No 189 A young male of the Bengal jabiru, moulting into the adult plumage, measured 4 ft 5 inches in total length by $7\frac{1}{4}$ ft in alar expanse, wing $23\frac{1}{2}$ in , tail $8\frac{1}{2}$ in , beak to forehead 13 in , and 2 in deep at base, bare part of tibia 9 in tarsi 13 in , middle toe and claw $4\frac{1}{2}$ in Another male, in full plumage but retaining a few scattered nestling feathers, showing its age to be about the same as that of the last corresponds exactly in its dimensions An old female is smaller, especially its legs the bare part of the tibia measuring but $7\frac{1}{2}$ inches, tarsi scarcely $11\frac{1}{2}$ in , and middle toe and claw 4 in , bill to forehead $12\frac{1}{2}$ in , and closed wing 22 in Bill black, irides of young dark and legs dark brownish-lake but the latter appear, in the adults, to have been coral-red (referring however to Mr Jerdon s catalogue, I perceive that he assigns 'rosy red' as the colour of the legs of this species) The mouth, anterior scapularies, smaller wing coverts primaries and secondaries, and the entire under parts are white head and neck brilliant steel black, with green reflections the crown reddish purple, margined with brownish-green and surrounded by steel purple posterior scapularies tertiaries the two greater ranges of wing coverts and the tail, bright green black, varied with steel blue The young have the neck and upper parts brown a little green glossed, and indications of white upon the smaller wing-coverts This bird is easily tamed and if brought up from the nest may be suffered to range at large with impunity, but it is apt to attack strangers, its beak constituting a most formidable thrusting weapon*

No 196 is perfectly identical with the European species, of which I have received a specimen from England and have obtained two others in this neighbourhood besides several from various parts of India

No 198 *a* I have obtained one specimen of a lapwing, closely resembling the *Vanellus leucurus* (Licht) figured by Savigny and which is stated in Griffith s work also to inhabit Tartary but it has not the rufous-isabelline hue of the Egyptian bird according to the figure alluded to, nor the defined ash-coloured patch on the breast being chiefly of a grayish brown, glossed with purplish-red upon the back, the breast inclining to cinereous throat white, and belly dull rosy-white or somewhat deeply blushed, tail pure white, primaries black, and the greater wing coverts broadly tipped with white, the next range more narrowly so, bill black, and legs bright yellow, no trace of crest, wattles or of spurs on the wing, the irides reddish-amber Length (of a female) 11 inches by 23 in in spread of wing, the closed wing $6\frac{3}{4}$ in , bill $1\frac{1}{8}$ in , and tarsi $2\frac{5}{8}$ in

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* It appears from the above description that the Indian *Mycteria* is the same with the *M australis* from Australia It cannot I think be referred to the *M asiatica*, Lath , as I before conjectured, and we have yet to learn what bird is indicated by the latter name —H L S

Of the *Lobivanellus cinereus* nobis, I procured many examples during the late cold season

Nos 201 and 202 I presume to be *Ch Geoffroyi* and *Ch Leschenaultii*

No 204 Also several specimens of *Charadrius Cantianus*

No 206 This is called *Himantopus asiaticus* by M Lesson, in the erroneous supposition that the bird has never a black cap, as in the European species

No 209 is *Totanus stagnatilis*, Bechstein also *T tenuirostris* Horsfield and figured by two or three names in Hardwicke s published drawings Respecting the greenshank, no 208, I certainly was never satisfied of the alleged distinctness of the so called *glottoides* of which I have seen many specimens from the Himalaya, all of which were decidedly *T glottis* as Mr Strickland suggests

No 212 is the European wood sandpiper commonly measuring $8\frac{3}{4}$ by 16 inches wing 5 or $5\frac{1}{8}$ in Dr Horsfield's *T affinis* is probably a stretched skin of the same[*] Judging from the few specimens brought to the bazar I was greatly astray in asserting *T ochropus* and *T hypoleucos* to be somewhat rare The latter is excessively abundant a little way down the river, along its banks, on those of the *nullahol* (natural or artificial canals) communicating with it, and about the *jheels* or marshy lakes, the latter being also favourite haunts of *T ochropus*

No 216 *et seq* *Terekia javanica* was rather plentiful at the commencement of last cold season, *Tringa platyrhyncha* less numerous than during the preceding season *Tr Temminckii* common, *Tr alpina* obtained once only a single specimen I have mentioned that *Tr canutus* has been once obtained by Mr Jerdon who has also procured a single example of *Calidris arenaria* Towards the mouth of the river, *Strepsilas interpres* occurs and probably also *Hæmatopus longirostris* which with *Numenius phæopus* I have received from both sides of the bay The *Eurhinorhynchus orientalis* nobis, has never yet occurred to me I have procured one fine fresh specimen of a common woodcock, which species is probably not so rare as its haunts are inaccessible, and as regards the snipe referred to *gallinago*, it appears always to have fourteen rectrices[†] Hardwicke's figure of *Scolopax Horsfieldii* Gray, has certainly not much the appearance of *Sc stenura*, but I doubt its being a peculiar species

No 231 I shall describe the Indian *Porphyrio*, which I cannot exactly satisfy myself is Dr Horsfield s Javanese species, and also another undetermined *Porphyrio* in the museum The former measures 17 or 18 inches by 30 to 33 in, wing $8\frac{3}{4}$ to $9\frac{1}{2}$ in, tail 4 in, bill to gape $1\frac{1}{2}$ in, tarsi $3\frac{1}{2}$ to $3\frac{3}{4}$ in middle toe and claw averaging $4\frac{1}{2}$ in, frontal shield large and broad, extending beyond the eyes, and squared posteriorly General colour purple, the fore-neck and breast verditer and wings the same inclining to greenish, crown somewhat dusky, the sides of the face and immediately around the frontal shield dull white, lower tail coverts pure white, the medial portion of the belly dusky slate, irides bright red-brown, bill and frontal disc dark coral-red, and legs and toes reddish carneous, with dusky lead coloured joints *

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[*] I have lately examined the original specimen of Dr Horsfield's *T affinis*, which is certainly the *glareola* It measures about 8 inches in length, the published measurement of 10 inches having been in error —H E S

[†] Be it remembered that the number of tail feathers is subject to variation in the British wild swans, a fact I have observed both in *Cygnus musicus* and *C Bewickii*

The other species is probably either from the Moluccas or from China Its size is rather superior to that of the Indian one the bill larger and more robust but the frontal shield smaller rounded posteriorly, and not reaching beyond the eyes In colour it is distinguished by having the back and scapularies green, the wings purple, the sides of the face dark passing into verditer and the crown, occiput and hind-neck dusky purplish, all the purple of this species being darker and less vivid than that of the other If undescribed, I propose to term it *P dorsalis* †

No 232 *Gallinula parvifrons*, nobis Distinguished from the European species by its inferior size and much less developed frontal shield in other respects quite similar, as are also its habits and note This bird is the *G akool* of Mr Jerdon s list, but I have also obtained the true *Porzana akool* (*Rallus akool* of Sykes) in this neighbourhood, a species having dark under tail coverts, and the legs dark reddish-brown

Nos 234 and 235 These are identical, the *Rallus rufescens*, Jerdon referring to the young female *Gal lugubris* Horsfield vel *G plumbea*, Vieillot of which I have obtained several examples ‡

Nos 239 and 240 Both of these are common

No 241 The only flamingo which I have myself obtained here is *Phœnicopterus minor*, but there is a Calcutta specimen of *Ph antiquorum* Tem, in the museum and I have received others from the upper provinces &c

Of Ducks the only additional species to be mentioned is the *Anas formosa*, Gmelin, of which I procured a splendid male shot on the salt-water lake § Length $16\frac{1}{2}$ by 27 inches Bill black, feet dingy yellowish olive darker on the webs irides dark the tracheal osseous vesicle small *Anas boschas* has not yet occurred, though Mr

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* It is evident from the above description that the Indian *Porphyrio* is not the *smaragnotus*, in which the back is of a pure olive green Neither can it, I think, be the *indicus* of Dr Horsfield (*smaragdinus*, Temm ), which is only 15 (not 19) inches long, and in which the back is described as nearly black with a greenish tinge The Indian bird appears from the description to approach most nearly to the European *P antiquorum*, Edwards, pl 87 in which however the frontal shield is said to be rounded Mr Blyth s second species seems to be the *smaragnotus* of Temminck, in which case the specimen was probably brought from S Africa —H L S

† This approaches the *P erythropus* of Stephens, which that author identifies with *P smaragnotus*, Tem

‡ Dr Horsfield s *Gallinula gularis* is also the young of his *lugubris* —H E S

§ This is a widely different species from the 'bimaculated duck' of English authors

Hodgson has met with it in Nepal, where, however, I have reason to suspect that it is very rare On the Indus it appears to be tolerably common This bird is represented in India generally and in the Burmese countries by *A pœcilorhyncha* which in many parts is extremely common and here is more so than I formerly supposed

No 262 This is the true *Podiceps minor*, though referred to *P phillipensis* by Mr Jerdon *P cristatus* is also found in the upper provinces

Nos 265 and 266 Both of these pelicans are common in suitable localities and they both vary exceedingly in size as much so as *Numenius arquata* and *Limosa melanura* I suspect that the females are always much smaller, but cannot pronounce upon this subject at present as I find that I omitted to add the sex, when subsequently ascertained to my notes on a number of recent specimens Two examples of *P onocrotalus* measured respectively 5½ ft by 8 ft 10 in , wing 26, tail 8 , bill to forehead 14½ in , and tarsi 5½ in , and 4 ft 8 in by 7 ft 10 in 23 7 11 and 5 Another stuffed specimen, which appears conspicuously larger than the first of these has the bill 15½ in , and wing 27 in The small one has the supplementary glistening reddish brown feathers on the breast analogous to the supplementary feathers of the cormorants when in breeding costume Of the other species which I term *rufescens* with considerable doubt an adult female measured 4½ ft by 7¼ ft wing 21 in tail 7 in , bill to forehead 12¼ in a young female is still smaller, and a young male much larger the bill measuring 14½ in , and the wing 23½ in This species has a row of dark spots along each lateral half of its upper mandible more or less developed the pouch also is commonly more or less spotted sometimes very thickly so the feathers of the head and neck are very different from those of *P onocrotalus*, being larger of lax and disunited texture and inclining upwards, as does also the occipital crest irides pearly-white in the adult those of the other being bright brownish red Colour of the adult white slightly blushed, and more conspicuously tinged with yellow, especially also the wings, which have lengthened slender hackles impending their coverts of a strongly marked yellowish cast back and rump dull brownish rosy head and neck tinged with ashy, from the bases of the feathers appearing externally and breast also covered with dingy-yellowish or yellowish brown hackles pouch ashy and legs leaden-black, slightly tinged with greenish , the claws white The young have the upper parts brown the feathers edged paler I have sent specimens to the museum of the India-house

Nos 270 and 271 These must both be referred to *Gelochelidon* of Brehm Both are numerous the former being nos 400 and 403 of Mr Jerdon s list and the latter nos 398 and 404 of the same Add *Anous tenuirostris* and *Rhynchops flavirostris*

No 274 Of this I have since procured a second specimen

On casting my eye over the original list, bearing in mind all the additions and corrections which have been here noticed I find that I have obtained about 293 species of birds in this immediate neighbourhood during a sojourn of two years and a half, and not count ing nos 1 4, 26 45 65, 67, 73, 82, 94, 117, 143, 149, 163, 171, 195 and 2/2, several of which might however be safely added Mr Jerdon's original list of the peninsular species generally (of the hills as well as of the plains) numbered 407 species, but of these several are merely nominal, though he has since added very considerably to that number If I had included all which I know to inhabit Bengal my list would have been much more extensive but I have confined myself exclusively to the species which I have procured within a few miles of Calcutta and so far are even these from being yet exhausted that I have obtained no less than three additional *Raptores* while writing out the present paper, namely *Pernis maculosa,* Lesson (for certain) *Circaetus gallicus* and a small *Accipiter* which is probably the *Khandesia* hawk long sought for by Mr Jerdon With respect to my own opportunities for out door observation I may here repeat that they have been hitherto extremely few for during the whole of the past year I was only one day absent from the museum, but I have now just returned from a week's excursion in the direction of the Soonderbuns and have no intention of remaining quite so much at home for the future Even in that short trip I found species of fish to be quite plentiful which I had never, or but very rarely, seen in the bazar, among them a splendid undescribed *Sciæna,* taken in abundance in the middle of the stream which I had only once or twice previously met with and so far as birds are concerned the extreme plentifulness of *Totanus hypoleucos,* and also the commonness of *T ochropus* I was previously unaware of, having formed a judgement from the few brought by the bazar shikarees in comparison to the multitudes which they bring of *T glareola* and some others

Postscript —Since the above was in type, a letter has been received from Mr Blyth, dated Calcutta May 9 1844, of which the following are extracts —

I avail myself of a steamer's departure direct from this to Suez to forward another communication to you on zoological matters The season is now over for collecting many things but still I continue to pick up a little and have received some valuable contributions from Arracan &c since I last wrote I have also just received a very interesting letter from Jerdon announcing a valuable collection on its way to me containing various novelties from Southern India and I likewise expect two other collections from the peninsula shortly In this neighbourhood I have just obtained another *Cuculus canorus,* also *Phænicophaust ristis* (Less the *longicaudatus* of my first monograph on *Cuculidæ*), and one specimen of an *Iora,* which proves after all, that *typhia* and *zeylonica* are one and the same This bird had about half acquired the black cap and back of *zeylonica* the change of colour taking place in the feathers themselves without a moult Yet it is strange, that of the great number of these birds which I have obtained both before and since, I have never procured another specimen with any trace of this *zeylonica* plumage Add *Rhipidura albofrontata* to the number of birds not found in this vicinity, but which occur on the eastern side of the mountains of Central India extending to the Monghyr and Rajmahl hills In my last letter I stated that the "Misham Yak,' so called, was merely a S African Gnoo, the frontlet of which had found its way to that distant locale, but a friend who has travelled in the Misham mountains, N E Assam, assures me that he saw there two or three similar frontlets, and I have just seen a female head of this "Assam Gnoo,' shot by the late Lieut Seppings of the Bengal Artillery to the northward of Bishnath one of our frontier stations towards Bootan, this settles the question of the animal being Asiatic and I shall now have the male and female frontlets figured without further delay Is it not an extraordinary discovery to get a Gnoo in this part of the world?—perhaps more so even than that of the Shan Bison [Ann Nat Hist vol xiii p 312] It will not however inhabit the Misham mountains, which are densely covered with jungle but the elevated plain beyond them I shall come out very strong shortly, with a long list of new mammalia, and there seems no end to the number of new birds which I have now by me to describe Among a variety of interesting specimens in spirits chiefly of reptiles and fishes and comprising no less than three new *Varani* among the former, are various bats comprising the genus *Rhinopoma* from Agra and Mirzapore I had previously been quite convinced, from the descriptions of people, that a bat of this genus was abundant in the Taj at Agra Phayre has now sent me chiefly from the vicinity of Sandowa Arracan as many as 139 species of birds, and several capital Mammalia. In the collection just arrived from him are two new monkeys which are doubtless, and one of them certainly, the two *Cercopitheci* mentioned by Helfer One is a small *Macacus* most allied to *M cynomolgus* and with a similar long tail, this I shall call *M cancrivorus*, from its habit of feeding principally on crustacea The other is a tremendously muscular fellow, closely allied to the pigtailed *Macacus* of Java (*nemestrinus*), and to the *arctoides* of Is Geoffroy it has a copious mane on its fore-quarters, from which I shall style it *M leoninus* I have also from the same quarter a new *Paradoxurus*, some new *Sciuridæ* and more specimens of the new *Manis* some of which I shall soon forward to Dr Horsfield Among the birds is a magnificent *Lyncornis* Gould, which if new may be called *L splendidus* Length about 15 inches, of wing 11¼, and tail 8½ in, the latter very broad, and the markings of it are superb, having alternate mottled ashy and mottled fulvous bands set off with black there are no rictal vibrissæ, the feet are as in *Caprimulgus* the wings firm and of considerable length, and the aigrette like feathers on the sides of the head are, I know, as in Gould's genus Do the other characters I have named also accord? The colour is difficult to describe without going much into detail but the throat and breast are principally black, the shoulders of the wings bright bay, the head and tertiaries minutely mottled, with no large spots except along the middle of the crown Does this brief description tally with either of Gould's species? Phayre has also sent a new genus resembling *Pomatorhinus* in all but the beak which is straight and much less compressed, also not so much elongated this I shall name *Orthorhinus* Likewise several new Bulbuls, and of *Nectarinidæ, Arachnothera inornata Nect goolparensis, Phayrei* (vel *Hasseltii?*), *mahrattensis jugularis lepida* (v *javanica*) and *phœnicotis Dicæum cruentatum cantillans,* and *chrysorchlorum,* nobis, &c &c A shikaree in my employ has just come in with three specimens of *Phœnicophaus tristis*, a live young *Nisaëtus caligatus*, &c

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## XVII —*Remarks on the genus* Eolidina *of M de Quatrefages*

By Joshua Alder and Albany Hancock, Esqrs

In a former communication on the Nudibranchiate Mollusca, we took occasion to express an opinion that the genus *Eolidina* of M de Quatrefages was not a good one, the species on which it was founded being, in our opinion, nothing more than an *Eolis* imperfectly observed It was irrelevant to the object of our former paper to enter into detail on the reasons which induced us to form such an opinion, but as its accuracy is doubted by M de Quatrefages, we shall now take the liberty of stating more fully our objections to his genus, in order that the facts connected with it may be more thoroughly investigated It is not our wish to enter into personal controversy, but the validity of a genus is a matter of sufficient importance in zoology to justify our remarks, more especially as there are some anomalous facts in comparative anatomy connected with it

On a careful examination of the description and figure which M de Quatrefages has given of his new genus, we must again assert, that we can find no external character to distinguish it from *Eolis* With reference to this he remarks, "that *Eolidina* wants the *lateral* or *labial tentacles*, and that all zoologists at present consider the presence or absence of these appendages as furnishing true generic characters" We must confess our inability exactly to understand what is here meant by "lateral or labial tentacles" Cuvier, in establishing the genus *Eolis*, described it to have *four to six* tentacles, but subsequent observations have proved that the third pair of tentacles of Cuvier are nothing more than prolongations of the sides of the foot, varying in length in each species and frequently entirely wanting Later zoologists have therefore, we think very properly, considered *Eolis* to have no more than four tentacles, two dorsal, and two oral or labial Now the species on which the genus *Eolidina* is founded has just this number of tentacles placed in the usual manner, it has also the anterior angles of the foot slightly produced, exactly as they appear in several species of *Eolis*, indeed so nearly does it approach to some of the English species, that doubts might be raised of its specific distinctness If then *Eolidina* is a distinct genus, it must depend upon anatomical characters alone We are well aware that it would be wrong to infer, in every case, the correspondence of internal characters from a similarity of outward form, but at the same time, when the external characters are so very similar as they are in the present instance, we should be led to expect, that if any difference in the anatomy did exist, it would not be such as to affect the most important animal functions The two remarkable deviations from the typical organization of the family which M de Quatrefages points out, are however of this kind We consider ourselves justified, therefore, in scrutinizing more narrowly the accuracy of his observations He complains that in asserting that the anus in *Eolis* is placed in the side, we do not enter into the details which are necessary to understand the relations of this orifice and the intestine proceeding from it with the gastro-vascular system

This relationship is very simple Our observations lead us to the conclusion, that the whole of the food which enters into the stomach does not pass into the gastro-vascular apparatus, indeed very little of the solid aliment enters it, and such as does is always driven back to the stomach, nothing being allowed to remain in this complicated system of vessels but the most refined portion of the products of digestion, such, in fact, as are capable of being converted into nutrition, and the mass of the grosser particles is conveyed by a short intestinal canal, crossing diagonally from the left to the right side of the body where the anus is situated It is placed a short way behind, and generally a little above the orifice of generation this we have ascertained beyond a doubt It is difficult to see the anus when in a state of repose, but when the intestine is filled with coloured matter, or during the expulsion of the excrement, it may be very readily observed In the latter case it is considerably enlarged and protruded into a nipple-shape Let us now turn to M de Quatrefages' description of these parts in *Eolidina* According to his views, the anus is situated posteriorly at the termination of the central vessel of the gastro-vascular system, and connected with it this central vessel he considers the intestinal canal It is evident however, that as very little of the solid portions of the nutriment is admitted into those vessels, and as never any of it is allowed to remain there, the anus so placed is not available for the expulsion of the grosser excrementitious matter, and cannot in fact be considered a true anus, indeed M de Quatrefages himself does not seem to consider it so If therefore this aperture (which we have not detected in *Eolis*) does exist, it can only be considered as an excretory orifice, somewhat similar to those that we have found at the ends of the papillæ*

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* Since the publication of our last paper, we have had the opportunity of continuing our observations on the ejection of small bodies from the ends of

How then does M. de Quatrefages consider that the excrement is disposed of in *Eolidina*? If we understand him rightly, he has recourse to the idea that it is voided again by the mouth, as in some of the Radiata and Zoophytes. Is not such a supposition contrary to all analogy in an animal so highly organized as this mollusk? And is it not, we would ask, much more probable that M. de Quatrefages has overlooked the true intestine and anus, which, from the minuteness of the subject and the delicacy of its tissues, are difficult to detect, than that such an anomaly in organization should exist? That we admit the possibility of a posterior dorsal anus in this family will be seen in our description of *Proctonotus*, in which such an arrangement is found, and we have since been favoured by a friend with the examination of an undescribed animal of this family belonging to a new genus which has a similar post-dorsal vent; but in both instances, this part, which is prominent and tubular, we believe to be a true anus, connected with the intestine, and not an appendage to the gastro-vascular system. In the animal observed by M. Milne Edwards it is probably the same.

The other point of anatomy which we dispute is the absence of a male intromittent organ in the generative apparatus, and the consequent androgynous mode of reproduction, widely different from that of the family to which it belongs. Here again we think that M. de Quatrefages has overlooked the part in question. We observe that he has also failed to discover this organ in his genus *Zephyrina*, and considers that circumstance a proof of the correctness of his observation in *Eolidina*. In another place he expresses an opinion that his *Zephyrina* is the same as our *Venilia* (*Proctonotus*), in which we are inclined to agree, though, from the vagueness of his description of the former, we are unable to say so with certainty*.

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the papillæ as there described. The contents of the ovate vesicle at the extremity of the papillæ are in most cases distinctly visible, and its action during the expulsion of the minute bodies is not at all obscure. When this takes place the sides of the vesicle are drawn towards each other, and the extremity, becoming tubular, is thrust into the very tip of the papilla where the orifice is placed. This action is generally repeated several times, each effort forcing the contents nearer the orifice, through which masses of small elliptical bodies are ejected at intervals with considerable violence, and occasionally to some distance. This certainly is very unlike disaggregation or diffluence from pressure, by which M. de Quatrefages supposes we may have been deceived. We used however during these examinations so little pressure that the papillæ could move freely about, and in one instance the animal crawled from one side of the compressor to the other while we were examining it.

* In the generic character of *Zephyrina*, as given by M. de Quatrefages, there is nothing to distinguish it from *Eolis*, excepting that it has respira-

Allowing then identity, we can assure him that *Proctonotus* has an intromittent organ similar to that of *Eolis*, as we have had the opportunity of seeing it exserted, and have a drawing of it in that state The argument therefore turns on the other side, for if M de Quatrefages has failed to detect it in one animal where it does exist, may he not also have done so in the other? These are our principal reasons for doubting the existence of the genus *Eolidina* We would, however, urge upon M de Quatrefages the desirableness of again procuring the animal for further examination*

M de Quatrefages has detached *Eolis* and the allied genera from the Nudibranchiata in order to unite them with *Acteon* and some other animals low in the scale of organization, and which seem to form a link between the Mollusca and *Planariæ*† We suspect that that gentleman, having prematurely determined on this apparently incongruous union, has been hurried too rapidly

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tory appendages on the head, "but forming only one row on each side of the head

The number of rows of papillæ, however, can only be considered as affording a specific character in this family, and several of the *Eolides* have the papillæ extending in front as far as the sides of the dorsal tentacula We mention this, not from any doubt that this animal is really distinct from *Eolis*, but as an example of the deficiency of the characters given as generic We afterwards learn that the respiratory appendages are continued *round* the head, which with the character of those appendages and other minor points of resemblance, induce us to believe that *Zephyrina* and *Proctonotus* are the same, though the latter has two rows of appendages on the sides and round the head, which, according to M de Quatrefages views of generic characters, would make them distinct Our observations on the internal anatomy, however, are much more at variance In the gastro vascular system, our animal had not the longitudinal vessels down the sides of the body, as represented by that gentleman, yet as all the vessels of that system were coloured in our species, we could not have overlooked them

* There are some other points of the anatomy of *Eolidina* which require further elucidation for instance, the stomach, according to the figure, is placed remarkably far forward in the system, nearly in the position, before the dorsal tentacles, which we find the mouth to occupy in *Eolis* M de Quatrefages says that he is confirmed in the opinion of its being the stomach, by having seen in this mass of an analogous animal *the back bone of a small fish* More recently, in his description of *Acteon elegans*, when speaking of its tongue, which closely resembles that curious organ in *Eolis*, he says, that at first sight he mistook it for *the back-bone of a small fish* Coupling these observations together, are there not grounds for supposing that M de Quatrefages has really mistaken the buccal mass for the stomach? If so, the diagram representing its connexion with the gastro-vascular system cannot be correct That *Eolidina* has a tongue similar to the rest of the family we cannot for a moment doubt, and this, as well as the corneous jaws, will most likely be detected on a re-examination

† Of the new genera described, *Acteonia* is the *Limapontia* of Johnston (Loudon's Mag Nat Hist vol ix p 79), and *Amphorina* appears not to differ from *Eolis*, except in the gastro-vascular system

to his conclusions, and perhaps has been too much inclined to form a low estimate of the characters of the *Eolidina*[*], thus making them correspond more nearly with their new allies Some of the statements that we have now attempted to controvert are of this nature, and M de Quatrefages is also inclined to disallow the existence of a heart and blood-vessels in *Zephyrina*, in which we suspect he is equally mistaken

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### *Annales des Sciences Naturelles*

February 1844 —*Zoology* —Considerations on some principles relating to the natural classification of animals and especially on the methodical arrangement of the Mammalia, by M Milne Edwards A very important and highly philosophical essay embodying the distinguished author s ideas on zoological classification the publication of which has been suggested by the paper of Mr Waterhouse in the 79th Number of the Annals of Natural History '—On some fossil Fish-teeth found in the neighbourhood of Staoulli, in the province of Algeria by M Valenciennes The formation in which these teeth were found is tertiary (miocene ?) they belong to three species of *Sargus* a *Chrysophrys* and an *Oxyrhina*, and are all extinct forms —On the *Trypanosoma sanguinis* a new species of *Hæmatozoon*, by M Gruby[†] This supposed animal (on the *individual* nature of which a doubt is thrown by M Milne Edwards) was found circulating in the blood of frogs in spring and summer Its body is long, flattened, transparent and twisted The cephalic extremity is terminated by slender elongated filaments and its caudal end terminates also in pointed filaments It moves rapidly in a screw like fashion —A translation of Mr Harry Goodsir s important paper on the Reproduction of Cirripeda —A translation of an abstract of Dr Carpenter s paper on the Microscopic Structure of Shells —Researches on Osteogenesis by Dr Lebert

*Botany* —Continuation of the monograph of the *Nidulariæ*, by MM L and C Tulasne (with admirable plates) —Observations on the genus *Aponogeton*, and on its natural affinities, by M E E Planchon The author proposes to place *Aponogeton* either among the *Alismaceæ*, as the type of a suborder intermediate between the *Alismaceæ* proper and the *Juncagineæ* or to consider it as the type of a new family of *Aponogetaceæ*, characterized by the absence of a perianth, by the ovaries being distinct and definite in number, by its few anatropous ovules attached to the base of the cell and above all

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[*] We use this word here, as employed by Mr MacGillivray, to designate the subfamily of which *Eolis* is the type *Eolidina* had previously been employed in this enlarged sense, of which fact M de Quatrefages does not appear to be aware

[†] See Annals, vol xiii p 158

by the free gemmule, of which the primordial leaves sheath only at the base Embryological figures illustrate the paper —Boissier, Plantæ Aucherianæ (*Umbelliferæ*)

### *Giornale Botanico Italiano*

A new botanical journal, which promises to be a valuable addition to our sources of information, has been established in Italy by the Botanical Section of the Scientific Congress, Prof Parlatore of Florence having undertaken the editorship, under the direction of a committee of the botanists resident in Tuscany

It is divided into three portions, under the separate titles of 'Original Memoirs,' Botanical Literature,' and Botanical Intelligence,' each part being separately paged

The first two numbers contain preface, plan of the work, collaborators —*Original memoirs* Meneghini on Gaudichaud s theory of the merithallus, Savi on some Microscopic organs of Plants, especially of *Chrysanthema*, Parlatore on the spirit of the last and present centuries in regard to natural science, Parlatore, Monograph of the Fumarias, Meneghini and Savi on the appendages of *Acacia cornigera*, Savi, Morphological considerations on the leaf of *Arduina bispinosa*, Puccinelli Additamentum ad Synopsin plantarum in agro Lucensi sponte nascentium

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*Miscellanea* Parlatore, Intelligence respecting the Italian central Herbarium at Florence, and the consignments received there, on the Italian meteorological Archiv, various short notices and intelligence

### BOOKS RECEIVED

*The Medals of Creation, or First Lessons in Geology and in the Study of Organic Remains* By Dr G A Mantell

*Essays on Natural History, chiefly Ornithology* By C Waterton, Esq

*A History of British Ferns* By Edward Newman Second edition

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## PROCEEDINGS OF LEARNED SOCIETIES

### ZOOLOGICAL SOCIETY

Dec 12, 1843 —William Yarrell, Esq, V P, in the Chair

"Descriptions of new species of *Navicella*, *Neritina*, *Nerita*, and *Natica*, in the cabinet of H Cuming, Esq," by C A Recluz

### NAVICELLA, Lamarck

1 NAVICELLA COOKII *Nav testâ ellipticâ, antice angustatâ,*

*convexâ, tenuiusculâ, transversìm crebrè striatâ, subepidermide olivaceo-lutescente, supernè carneâ, lineolis transversis creberrimis lineas latiusculas efformantibus reticulatâ, interstitiis maculis oblongo-acutis lutescentibus, superioribus interdum latioribus pictâ, apice submarginali, integerrimo, aperturâ cærulescente, intùs croceâ, labio luteo fuscescente*

Var β *Testâ carneo-violacescente, fasciis nigris radiantibus, basi ac lateraliter ramosis, lineis transversis nullis aperturâ intus croceo maculatâ, maculâ nigro latè marginatâ*

*Hab* "Island of Johanna, one of the Commoro islands, found in a small stream by the Rev W V Hennah" H Cuming

2 Navicella lineata, Lamarck

Var γ *Testâ lineolis transversis tenuissimis, undulatis, creberrimis, olivaceis, et maculis oblongis ac linearibus, lutescentibus pictâ, apice ferè marginali, subviolaceo, suprà albido, lævissimè biradiato*

*Hab* "Ganges, Bengal" H Cuming

## NERITA, Linnæus

Sect A *Labio intus integerrimo, labio supernè nec emarginato*

### Gen NERITINA, Lamarck, Férussac, &c

1 **Nerita Siquijorensis** *Ner testâ ovato transversâ, posticè angustatâ, dorso convexâ, supernè planulatâ, solidâ, longitudinaliter tenuiter et crebrè striatâ, spadiceo-reticulatâ, interstitiis maculis oblongis, anticè acutis, albidis seu lutescentibus pictâ, anfractibus 1½, apice retuso, aperturâ extùs ovatâ, intùs lutescente, labio plano, margine et in medio vix arcuato et tenuiter crenato, labro subcontinuo, lateralibus rectiusculo*

Var β *Testâ spadiceo-reticulatâ, fasciis albidis 2–3 cinctâ, labio externè fuscescente tincto*

*Hab* "Isle of Siquijor, in a small stream" H Cuming

2 **Nerita africana** *Ner testâ ovato conoideâ, subepidermide nigrescente striis nigris longitudinalibus creberrimis et maculis oblongis vel ovatis transversis, luteis, anticè acutis et nigro marginatis, subregularibus, undique pictâ, anfractibus tribus subconicis, infimo supernè rugis raris notato, spirâ vix prominulâ, apice erosa, aperturâ obliquâ, extùs semi oblongâ, intùs albido-cinerascente, labio convexiusculo supernè calloso, anticè plano, rectiusculo et lævissimè crenato*

Var α *Anfractu infimo depresso, labro supernè vix fornicato et antrorsum productiusculo, labio posticè lutescente*

Var β *Anfractu infimo dorso convexo, labio posticè aurantio*

*Hab* "Island of Fernando Po, west coast of Africa, found in a small stream by Capt Downs, R N" H Cuming

3 **Nerita (Clithon) Da Costæ** *Ner testâ subglobosâ, suprà medium vix angulosâ, muticâ, olivaceâ, maculis triangularibus albidis, antice acutè nigris pictâ et fasciis pallidissimè interdum obsoletis cinctâ, anfractibus quaternis plano-declivis, spirâ sub-*

*conicâ, apice erosâ, aperturâ subrotundâ, intùs albâ et pallidè cærulescente 3–4 fasciatâ, labio compresso, angusto, valde declivi, superne transversim calloso, margine crenato et in medio tenuiter arcuato, labio infernè dilatato, supernè subfornicato*

*Hab* "Isle of Negros, in a mountain stream" H Cuming

4 Nerita Leachii, Recluz in Guérin, Rev Cuvier 1841, p 312 no 33

Var β *Testâ subglobosâ pallidè fusca luteo bifasciatâ*

Var γ ? *Testa subglobosâ, nigerrimâ, maculis punctiformibus vix triangularibus obsitâ, nec fasciatâ*

An var *Neritæ guttata*, Recluz in Rev Cuv 1841 p 316 no 40?

Var δ ? *Testâ semiglobosâ tenuiore striis longitudinalibus regularibus creberrimis, transversis, tenuissimis nigerrimâ maculis sparsis raris et fasciis angustis binis lutescentibus maculis parvulis triangularibus pallidioribus confertis picta*

*Hab* 'Isle of Bohol, found in a small stream H Cuming

5 Nerita Sayana 'Ner *testâ ventricoso-ovatâ, longitudinaliter substriata tenuiusculâ nitidulâ nigratâ maculis fuscis seu lutescentibus, diversiformibus variegatâ aut fuscâ et nigrescente nebulata, anfractibus duobus, primo partim deroso infimo supernè depresso, aperturâ subrotundâ, intùs albâ, labio calloso plano declivi margine recto in medio tenuissimè crenato*

*Hab* Island of Guimaras, Philippines, in small streams H Cuming

6 Nerita (Clithon) subpunctata *Ner testâ semiglobosâ, olivaceo fuscâ tenuiter rugatâ rugis punctis nigrescentibus seriatis notatis, subepidermide alba, nigro reticulatâ, anfractu unico suprà medium anguloso, apice perforato, aperturâ extùs subrotundâ, intus albo cinerascente, labio semilunari plano supernè calloso, margine in medio tenuiter arcuato et crenulato, dente cardinali majore truncato*

*Hab* "Sinait, province of North Ilocos, isle of Luzon, in a small mountain stream' H Cuming

Sect B *Labro intus sæpius sulcato, labio supernè emarginato*

7 Nerita Grayana *Ner testâ ovato globosâ dorso obliquè conoideâ, transversim sulcatâ sulcis costis latioribus striis longitudinalibus creberrimis sculptâ, anfractibus sordidè nigro violaceis, obsoletè albo maculatis, spirâ prominulâ conico-depressâ acutâ, apertura pallidè fuscescente, labio planulato, margine tridentato, suprà rugis confertis valde impresso, labro intùs regulariter sulcato supernè unidentato*

*Hab* "Port Curimao province of North Ilocos, isle of Luzon, on the rocks at low water H Cuming

8 Nerita Panayensis *Ner testâ parvâ, ovato-conicâ, aurantiâ, transversim sulcatâ, longitudinaliter crebrè striatâ, costis subter lente subgranosis, spirâ conico-acutâ, labio plano, lacteo, dentibus tribus remotis instructo, labro margine crenato, intùs calloso, lacteo planè lævissimo*

Var β *Testâ ventricoso-globosâ spirâ vix exsertâ, minimâ, labio basi ruguloso et margine crenulis plurimis notato*

*Hab* "Ilo Ilo, province of Panay, under stones at low water" H Cuming

9 NERITA BEANIANA *Ner testâ ovatâ, posticè angustatâ, transversim crebre et tenuiter sulcatâ nigrâ sive olivaceo-nigricante, fasciis croceis cinctâ, spirâ obtusâ decorticatâ, aperturâ albâ, fauce luteâ, labio compresso-plano luteo-fuscescente, granulis nigris signato margine lævissimè arcuatim excavato, subedentulo, labro intùs striis tenuissimis elongatis nigris instructo*

Var β *Testâ olivaceo-nigricante lineis nigris et lutescentibus, æquidistantibus fasciatâ, labio suprà rugoso, medio nigro granuloso, labro intus læviter incrasso et lævissimo*

Var γ *Testa costis subnullis, striis longitudinalibus creberrimis obsoletisque*

*Operculum nigrescens minimè granulatum, subtùs carneo lutescente, fasciis tribus griseis pictum costulâ planâ, obsoletâ, antice marginatum Dente apicali brevi truncato infimo transverso arcuato plano posticè dilatato, truncato, superficie substriatâ*

*Hab* Isle of Corregidor, bay of Manila, under stones at low water' H Cuming

10 NERITA HINDSII *Ner testâ semiglobosâ solidâ cinerea sive albida nigro obscure articulatâ transversim læviter sulcatâ, striis longitudinalibus undulatis sulcis interdum decussantibus insculptâ, spirâ parvâ convexo depressâ vix exsertâ, aperturâ dilute stramineâ, labio angusto compresso subconcavo rugoso et granuloso, margine in medio 2–4 denticulato, labro intus valde calloso et longe sulcato Operculum pallide cinereo fuscescens, granulosum, obsolete biangulosum albido-viridescens, antice angulum planissimum circumdatum Dente apicali plano, supernè læviter incrassato, brevi truncato basi maculâ fuscâ notatâ, infimo arcuato substriato postice parùm dilatato, truncato*

*Hab* 'Ilo-Ilo, isle of Panay, under stones at low water" H Cuming

11 NERITA SPENGLERIANA *Ner testâ orbiculato-conicâ, transversim lævissime sulcatâ, sulcis basi obsoletis albidâ nigro-zonatâ, spirâ conico-acutâ lutescente, nigro punctatâ, sulcis profundioribus, labio albo lævigato, margine subbidentato, labro intus incrassato, lævissimo Operculum pallidè fuscum tenuissimè granulosum, subtùs pallide rufum Dente apicali obsoleto, infimo arcuato, transversim substriato, postice superficie dilatatâ et truncatâ*

*Hab* "Ilo Ilo, isle of Panay; under stones at low water' H Cuming

12 NERITA RUMPHII, Récluz, Rev Cuvier 1841 p 147 no 10

Var 1 Récluz, *loco citato, Nerita polita oceani australis*, Chemnitz, Conch v p 321 tab 193 f 2013 et 2014

*Hab* Trenate, Molucca Islands, under stones at low water" H Cuming

Fauce nitidissime rubio sanguineâ

Var 2 *Testâ striis transversis nullis, fasciis viridescentibus immaculatis alternis albis sive pallide rufescentibus, nigro articulatis, aperturâ sanguineâ, labio bidentato, labro intùs crebre sulcato*
Chemnitz, Conch v p 319 pl 193 f 2010
"Island of Trenate, Molucca Islands, on the reefs"
*Operculum Neritæ Rumphii* Forma *Ner Orbignyanæ* accedens sed diversa

Var 3 *Testâ albâ maculis nigris latis seriatis unifasciatâ*
"Isle of Ticao, under stones at low water"

Var 4 *Testâ albido lutescente, nigro late unifasciatâ*
'Isle of Ticao, &c'

Var 5 *Testâ nigrescente, ravido fasciatâ*
"Isle of Masbate under stones at low water"

Var 6 *Testâ nigrâ albo angustè trifasciatâ*
"Isle of Corregidor, off Manila, under stones

Var 7 *Testâ olivaceâ, nigro variâ, in medio albo-unifasciatâ fasciâ lineis angustis olivaceis articulatâ*
"Isle of Masbate, under stones'

Var 8 *Testa lutescente, cæruleo-undatâ, fasciis tribus e maculis rubris articulatis*
'St Nicolas, island of Zebu, under stones

Var 9 *Testa nigrâ, venis albis et maculis concoloribus picta*
'Trenate, Molucca Islands under stones"

Var 10 *Testâ rufescente aut cinereâ maculis nigris hastatis transversis pictâ*
An Chemnitz, v p 320 pl 193 f 2011 *Nerita pennata* Deshayes in Lamarck, ed alt t viii p 613 no 23† (vidi in collectione ejus) non Born, *Nerita pennata* (Hæc est *Ner piperina*, Chemnitz, Conch xi p 73 tab 197 f 1905 1906 Lister Conch Synops pl 604 f 29, *Neritina piperata* Sow Conch Illust f 18)
"Port of Curimao, province of North Ilocos, isle of Luzon, under stones"

Var 11 *Testâ rufescente aut albidâ, roseo-trifasciatâ et maculis viridibus parvis seu nebulis variâ*
'Isle of Masbate, under stones

Var 12 *Testâ violaceâ, albo anguste trifasciatâ*
"Isle of Corregidor, &c"

Var 13 *Testâ luteo-rufescente, albo-trifasciatâ, fasciis nigro sive viridescente articulatis*
"Isle of Burias, under stones"

Var 14 *Testâ fusco-nigrescente pallidâ, fasciis tribus nigris, et maculis albis sparsis pictâ*
"Isle of Siquijor under stones, and port of Curimao, province of North Ilocos, isle of Luzon"

Var 15 *Testâ luteo-rufescente, maculis albis transversis parvulis pictâ, nigrescente obsoletè trifasciatâ*
Trenate, Molucca Islands

Var 16 *Testá nigro, ravido et albido-fuscescente fasciatá*
" Isle of Siquijor, &c "

Var 17 *Testá tenui, striis cancellatá, fusco-rufescente, interdum maculis nigris parvulis hastatis pictá, labio planissimo antice valdè denticulato*
" Isle of Siquijor, &c '

Var 18 *Testá albá, rufescente fulguratá sive roseo-trifasciatá*
" St Nicolas, isle of Zebu, &c '

Var 19 *Testá lutescente, fasciis viridescentibus zonisque albis nigro-maculatis marginatis*
" Isle of Ticao, under stones '

Var 20 *Testá albo-vinosá, nigro latè bifasciatá et in interstitiis interdum viridescente zonatá*
" Isle of Corregidor bay of Manila "

Var 21 *Testá albá aut fuscescente, venis nigris longitudinalibus pictá et albo unifasciatá*
Isle of Corregidor, &c "

Var 22 *Testá sordidè vinosá seu fusco-violaceá, fasciis tribus albis cinereo articulatis seu nebulosis*
" Isle of Burias "

Var 23 *Testá purpureo nigrescente fuscescente nigro punctatá sive albo-bifasciatá, fasciis cinereo nebulosis*
" Port of Curimao, province of North Ilocos, isle of Luzon "

Var 24 *Testá albido-lutescente, nigro angustè bifasciatá*
" Isle of Corregidor '

Var 25 *Testá virescente, albo angustè trifasciatá*
" Isle of Corregidor "

Var 26 *Testá cancellatá, totá nigrá*
' Isle of Corregidor '

Var 27 *Testá fusco-nigricante, maculis nigris transversis intensioribus pictá*
" From Pasacos isle of Luzon "

Var 28 *Testá griseá, maculis albis obsolete tessellatá*
' Isle of Ticao '

Var 29 *Testá pallidè fusco-rubellá trifasciatá, venis albis lineatá, interstitiis albo angustè marginatis, fasciá albá spiram decurrente*
" St Estevan, province of South Ilocos, isle of Luzon '

Var 30 *Testá dilutè chocolatá, albido fasciatá*
" Isle of Burias '

Var 31 *Testá luteo-castaneá, albo angustè trifasciatá, transversim regulariter sulcatá seu lævissimè ad spiram tantum spiraliter cingulatá*
" Isle of Corregidor "

Var 32 *Testá omninò aurantiá*
" Jimmamaylan, isle of Negros '

## NATICA, Adanson

### A Umbilicum funiculatum

*Obs* —Funiculus Columna, callosa auctorum, columella adhærens et in umbilico spiraliter contorta apice plùs minùsve dilatato, truncato rarius convexo aut rotundato

* *Testa subglobosa, operculum testaceum* Gen *Nacca*, Risso

1 NATICA PICTA *Nat testâ ventricoso globosâ tenuiusculâ, lævigatâ luteo rufescente albo anguste 3–4 fasciatâ fasciis remotis maculis spadiceis sagittatis articulatis superâ ad suturam spadiceo-marginatâ, spirâ convexo-conicâ apice spadicea, aperturâ intùs fulvâ, columellâ rectâ basim versus concaviusculâ supernè breviter reflexâ, umbilico coarctato quadrato, canali arcuato extùs zonâ albâ maculis spadiceis undulatis radiato, funiculo crasso canalem angustante*

*Hab* 'Basey island of Samar Philippines found on the reefs H Cuming

*Testâ fundo pallidè chocolato, fasciâ supremâ rarò maculis supremis majoribus et intensioribus, anfractibus quinis, convexis, superne depressiusculis*

2 NATICA LUZONIA *Nat testâ ventricoso-globosâ tenui albâ lineolis creberrimis longitudinalibus luteo spadiceis et fasciis tribus e maculis sagittiformibus concoloribus in supremâ angulatis pictâ, spirâ convexo acutâ, aperturâ albidâ basi et externè subacutâ, labio rectiusculo supernè breviter reflexo et tenuissimo umbilico rotundato extus zonâ alba maculis spadiceis circumdato, funiculo angusto supernè interdum rotundato et dilatato cavitates angustante, labro fragili*

*Operculum testaceum tenue lineolis elevatis 2–3 antice cinctum*

An *Nat zebra* var ?

*Hab* 'With *Natica zebra* from Cagayan province of Misamis island of Mindanao, found in sandy mud at twenty five fathoms and with *Natica areolata* from the isle of Capul, Philippines, on the reefs' H Cuming

3 NATICA ORIENTALIS, Gmelin

Var γ *Testâ rufâ, suturâ anguste canaliculatâ albâ*

Var δ *Testâ subepidermide fuscescente albidâ, suturâ canaliculatâ epidermide fusco creberrime striatâ*

Var ε ? *Testâ minor, subepidermide pallide fusco-albâ zonis binis e maculis elongato quadratis spadiceis seriatim picta, suturâ profundâ epidermide fusco creberrime striatâ, aperturâ basi minus auctâ et acutâ, funiculo coarctato*

*Hab* "Singapore found in sandy mud H Cuming

4 NATICA BRODERIPIANA *Nat testâ globoso ovatâ solidiuscula, luteâ seu pallide fuscâ, zonis albis spadiceo maculatis cinctâ longitudinaliter tenuiter sulcatâ sulcis supernè et infernè profundioribus, spirâ conico acutâ, apice fusco spadiceâ, suturâ fasciolâ albo marginatâ, aperturâ basi et externe annulosâ, columellâ in*

*medio arcuatim concavâ, supernè et infernè incrassatâ, umbilico dilatato profundo zonâ albâ lævigata circumdato, canali umbilico lineari, funiculo crasso largo, depresso.*

*Testa anfractibus 5–6 convexis, subcostatis. Maculæ fasciarum nunc quadratæ nunc transversim oblongæ seu arcuatæ, fasciæ medianæ maculæ biseriatæ, infimæ parvulæ. Labrum solidum. Operculum testaceum, anticè striis tribus arcuatum, in medio costâ arcuatâ valde exsertâ sculptatum, apice puncto calloso notato, posticè infernè ad marginem crebrè rugoso seu crenulato et in medio ventricoso.*

*Hab.* "Xipixapi, West Colombia, sandy mud, sixteen fathoms." H. Cuming.

5. NATICA ELENÆ. *Nat. testâ ventricoso-globosâ, posticè angustatâ, tenui, longitudinaliter striis æquidistantibus supernè et infernè profundioribus, striolis transversis creberrimis subcancellatis sculptâ, albido-stramineâ, lineolis crebris undulatis longitudinalibus pictâ, anfractu infimo supernè planulato; spirâ convexo-conicâ, subacutâ; aperturâ basi subangulosâ, supernè rotundatâ; labio subrecto, in medio subarcuato, supernè calloso; umbilico dilatato profundo spirali, canali lineari, funiculo lato, supernè crasso et obliquè truncato; labro fragili.*

Var. β? *Testâ minori ventricoso-ovatâ, anfractibus senis supernè planatis gradatis, superioribus longitudinaliter striatis, infimo lævigato lineis spadiceis remotiusculis subundulatis picto; spirâ conico-acutâ; columellâ rectâ, supernè et infernè incrassatâ; canali umbilico profundè arcuato valdè latiore; funiculo angusto; aperturâ semi-oblongâ.*

*Hab.* "St. Elena, West Colombia, found in sandy mud at six fathoms." H. Cuming.

*Testâ tenuiori, sulcis longitudinalibus striæformibus, anfractu infimo transverso, anticè dilatato posticèque angustato, fasciis nullis, lineis spadiceis crebris undulatis angulatisque, spirâ minori, columellâ minus concavâ, funiculo crassiore à* Naticâ Broderipianâ *differt.*

Var. β. *Forma* Naticæ [illegible] *Adansonii accedens sed diversa, an species nova?*

*Umbilicus testaceus anticè triangulatus, in medio costâ latâ, crassâ, exsertâ, sulco anticè cinctâ et posticè revolutâ insculptus, area posticâ arcuatim sulcatâ. Margo postica transversim crenulata, crenis inferioribus valde impressis.*

6. NATICA AREOLATA. *Nat. testâ ventricoso-globosâ, tenui, parvâ, subpellucidâ, glaucinâ seu luteâ, lineis angulato-flexuosis sæpe basi latioribus arcuatisque pictâ ornatis; spirâ convexo-conicâ, apice fuscâ; aperturâ subviolaceâ; labio obliquè rectiusculo, ad umbilicum subconvexo, basim versus arcuatim rotundato; funiculo crasso, supernè rotundato, plano, umbilicum canalemque valdè angustante.*

Var. β. *Testa minor, maculis luteis anticè albo marginatis ac arcuatis subseriebus 3–4-cincta, interdum confluentibus; anfractibus supernè zonâ dilutè aurantiâ lineâ albâ marginatâ ornatis.*

Rumph Mus tab 22 fig G *bona,* non *Natica zebra,* Lamk
*Hab* "Island of Capul found on the reefs, Philippines" H Cuming. Amboina (Mus Paris et Rumphius)

7 NATICA FULGURANS *Nat testâ ovatâ, ventricosa, tenuiter striatâ, albâ, flammeis fulgurantibus spadiceo nigris interdum confluentibus pictâ, spirâ conicâ, acutâ, aperturâ albâ, columellâ obliquâ, rectiusculâ, umbilico profundo, canali latiusculo, funiculo depresso, superne basique compresso, labro basi obliquè rectiusculo, crasso, compresso*

*Hab* "Le Senegal (Mme Dupont)"

*Testa alba seu dilute ravida, flammis interruptis in zonas transversas efformantibus sæpe dispositis*

8 NATICA COLLIEI *Nat testâ ventricoso-globosâ albâ maculis spadiceo-fuscis quinque seriatis seriebus duabus maculis rufis quadratis interdum angulatis alteris punctiformibus cinctâ, spirâ convexâ, apice acutâ, anfractibus superne planiusculis, radiatim breviter striatis, aperturâ albidâ, intùs subflammulatâ, umbilico arcuato, profundo, funiculo parvo, columellâ oblique rectiusculâ*

Var β *Testa maculis quadratis quinque seriatis cincta, seriebus tribus medianis maculis majoribus interdum confluentibus, aperturâ intus roseâ, funiculo crasso extùs ad sinistram obliquè planulato basi canali propinquiori*

*Hab* ' Swan River, Australia, found on stones, low water, by Lieut Collie R N Var from the island of Ticao found on the reefs" H Cuming

9 NATICA FANEL, Adanson

Var β *Testa alba, seu albo subvinosa maculis rotundatis atropurpureis, paucis interdum confluentibus picta*

*Natica variolaria,* nobis olim

*Hab* "Zanzebar, east coast of Africa, collected by Mr Thomas Thorre" H Cuming

*Testa subglobosa ovata, ventricosa nitidissima lævigata Anfractibus senis convexis, superne depresso planis, radiatim tenuiter striatis, fere gradatis Spira conica, apice acutiusculo Apertura semirotunda, alba, obliquata Columella obliquè recta, angusta supernè breviter reflexa, adnata basi in labro continuato et incrassato Umbilicum semirotundum, fuscum, profundum Funiculum depressum, latiusculum, rufum, superne vix callosum, semiovatum, columellæ adnatum Operculum?*

10 NATICA GAMBIÆ *Nat testâ ventricoso-ovatâ, interdum subglobosâ, crassâ albida seu dilutè carneolatâ, anfractibus convexis, lævigatis, superne longè radiatim striatis, superioribus suprà depresso-planiusculis, spirâ conico-depressâ, acutâ, aperturâ obliquâ, albâ, columellâ rectâ superne incrassatâ, callosâ, umbilico parvo, canali arcuato, profundo, funiculo magno, supernè dilatato plano, semiovato, labro crasso*

Var β *Testâ ovatâ, substriatâ, superne cinereo fuscescente, fusco* *obscurè zonatâ, infernè albidâ, submedio zonâ pallidâ cincta, spirâ glaucescente, aperturâ intùs fusco-purpurascente*

*Operculum testaceum, solidum, ad apicem tenuiusculum, lacteum, posticè marginem versus fuscum, lævigatum, anticè lineâ angustâ circumdatum Varietates innumeræ* Naticæ maroccanæ *Chemnitzii* (*Nat marochiensis* Lamk non Menke nec Philippi, quæ est *Nerita* (Natica) *glaucina* Linné certè) *differt, formâ, facie, consistentiâ, umbilico, funiculo et operculo Rara*

*Hab* "River Gambia, found on the sands by Mr Beale of Jersey' H Cuming

11 NATICA CANRENA, Lamk

*Nerita canrena* Linn, Mus L U p 674 no 383 Synonymis et variet exclusis

Var β *Minor, tenuior magnitudinis avellanæ zonis tribus albis et totidem fuscis pallidis cincta, zonis albis medio ventris lineis arcuatis spadiceis ornatis, superâ maculis spadiceis arcuatis pictâ, suturâ fasciâ angustâ luteâ marginatâ, striis radiatis crebris sculptâ, umbilico parvo, canali profundo, arcuato, zonâ latissimâ albâ circumdato et maculis spadiceis remotis notatâ*

*Hab* "Jacna, isle of Bohol, Philippines, twelve fathoms, sandy mud' H Cuming

An eadem ut typus Linnei?

Var γ *Testâ, omninò albâ, ad suturam lacteo fasciatâ, labro fragili*

*Hab* "Island of St Vincent North America' H Cuming

12 NATICA PAVIMENTUM *Nat testâ ovato-obtusâ subglobosâ, parvulâ, exalbidâ lacteo-quadrifasciatâ, supremâ latâ lineis rufis radiatis, tribus inferioribus angustioribus maculis quadratis rufis seriatis articulatis pictâ, spirâ convexo-rotundatâ parvâ, vix prominenti, aperturâ albâ, obliquâ, columellâ rectâ, solidâ, funiculo semirotundo, umbilico parvulo omninò occultante*

Var β *Testâ fasciâ medii ventris maculis longitudinaliter oblongo-quadratis remotioribus picta*

*Testâ anfractibus quinis convexo-depressis, infimo convexiore, suturâ vix impressâ Operculum ?*

*Hab* "The island of Ticao, Philippines, found on the reefs" H Cuming

13 NATICA GUALTERIANA *Nat testâ subovatâ, semigloboso acutâ tenui, subepidermide fuscescente albidâ, punctis quadratis spadiceis seriatis in medio ventris trifasciatâ, superne lineis concoloribus obsoletisque decurrentibus ornatâ, anfractibus ventricosis, ad suturam longe et crebre striatis, fasciâ albâ circumdatis, spirâ conico-acutâ, aperturâ dilatatâ, basi subproductâ et angulosâ, umbilico parvo, funiculo semiovato, suprà oblique plano, umbilicum et canalem valde occultante*

Var β *Testa minor, fasciis punctorum in medio ventris ultimi duabus*

*Hab* "Sual, province of Pangasinan, island of Luzon, found at five to seven fathoms, on sand" H Cuming

** *Testa subovata seu ovata, operculum cartilaginosum, Gen* Natica, *Risso*

MAMILLATÆ Récluz

14 NATICA PANAMAENSIS *Nat testâ ovato-globosâ, ventricosâ, ponderosâ albidâ, anfractibus septenis supremis depresso-convexis, infimo ad peripheriam depresso-planulato, suprà subanguloso, declivi seu convexiusculo, striis tenuissimis impresso, spirâ conicâ, acutâ, aperturâ obliquâ oblongo-semilunari, columellâ superne et anticè ventricosâ valdè incrassatâ, calloso-lacteâ, convexâ, sub umbilico productiusculâ, umbilico profundo, funiculo intus subobsoleto, externe oblongo, calloso et cum callo columellæ consolidato, labro tenuiusculo*

*Operculum cartilaginosum, radiatim tenuiter striatum, dilutè fuscum*

*Sinu Panama propria*

*Hab* "Panama; found at ten fathoms in fine sand" H Cuming

15 NATICA FLEMINGIANA *Nat testâ ovato-oblongâ crassiusculâ lactea nitidâ politâ, lævissime striatâ, anfractibus senis, depresso convexiusculis, infimo ovato convexo, superne subconico, spirâ depresso-conicâ apice exalbido, aperturâ angustâ, semirotundâ, columella obliquè rectiusculâ in medio subconvexâ externè callosâ crassâ, umbilico profundo, superne partim tecto externe angulo vix notato circumdato, basi in canalem profundum arcuatum prolongato, a funiculo modificato*

Junior *Canali umbilico subconsolidato lineari*

*Operculum cartilagineum, luteum tenuissimum margine antico hyalino zonatum, fasciâ latâ purpureo-rufâ, apice revolutâ, superficie eleganter radiatim striatâ valdè differt Testa interdum albo dilute straminea seu ferrugineo partim tincta*

*Hab* Sorsogon, isle of Luzon, found in sand and small stones H Cuming

*Nerita mamilla,* var *lacteæ,* Linnæi valde affinis, sed spira acuta et umbilico aperto differt *Naticæ vavaoi* Le Guillou proxima, sed columella convexiore, basi et interne non angulata rotundato-concava angulo umbilici remotiore et lineæformi canali umbilici angustiore et columella suprà medium convexiuscula transversim nec sulco obsoleto instructâ dissimilis est *Natica uber,* Valenciennes, ferè simillima sed in hac operculum cartilagineum omninò luteum et striis tenuioribus, in *Nat Flemingianâ*

16 NATICA DUBIA *Nat testâ ventricoso-ovata seu globoso-acutâ, lævigatâ, crassâ, ponderosâ albido stramineâ, ad suturam obscure fasciatâ et transversim obsolete striatâ spirâ conico depressâ, plus minusve prominula acutâ, aperturâ semirotundâ, intus submargaritaceâ, labio antice recto, basi incrassato, supernè valdè calloso callo suprà medium convexo, umbilico spirali, in canalem profundum arcuatumque prolongatum et funiculo modificatum sive fere sive omninò obtecto, labro solido*

*Hab* 'Chili?' H Cuming

*Naticæ Flemingianæ* proxima, sed solidiore, ventricosiore, ponde rosâ columellâ nec anticè convexa, supernè valdè convexâ, umbilico interdum occultato, differt

17 Natica uberina, Valenciennes in Mem Geol de Humboldt

Var β *Testâ ovato-conicâ, obsoletissimè cancellatâ, anfractibus superne conicis, spirâ elongatâ conicâ, canali umbilici et capite funiculi magis elongati*

*Hab* "Casma, Peru, found in muddy sand, five fathoms" H Cuming

18 Natica Cumingiana *Nat testâ ovato-ventricosâ, luteo aurantiâ, ponderosâ, supernè tenuiter et crebre striatâ nitidissimâ, anfractibus senis conico-depressis, infimo ventricoso, suprà lævissimè conico, spirâ conico depressâ acutâ, partim albâ, suturâ subobliteratâ, aperturâ oblongo semilunari albâ, columellâ lacteâ rectiusculâ, in medio subconvexâ superne et externè incrassatâ, callosâ, umbilico patulo spirali, canali largo semirotundo, lacteo biangoloso, angulo interno spirali, externo posticè carinato, funiculo lacteo crasso externè semirotundato internè depresso, spirali umbilicum modificante*

Junior *Testâ tenuiore, carneolatâ spirâ lacteâ angulis umbilici obsoletis, callo columellæ suprà umbilicum sulco transverso notato, in adulto vix conspicuo*

*Operculum rubicundum striis radiatum et tenuissimè longitudinaliter arcuatimque impressum anticè zonâ hyalinâ circumdatum* Natica aurantia, *var* lutea, *nobis* (*Nerita mamilla*, var *lutea*, Linné), *proxima sed ventricosiori, majori et umbilico patulo funiculato diversa est* Naticæ porcelanæ, *D Orbigny multò major, ventricosior, aurantiâ ac non stramineâ dissimilis*

*Hab* "Island of Cayo, Philippines, found in sandy mud, de[illegible] water" H Cuming

Junior *Naticæ fuscatæ*, nobis (*Nerita mamma veneris fuscata seu lutea*, Chemnitz, Conch, p 282 pl 189 f 1932 1933) accedens sed diversa

19 Natica Powisiana *Nat testâ ventricoso-ovatâ, crassâ, nitidâ, rufo purpurascente, interdum rufo obscure fasciatis anfractibus senis convexo depressis, infimo fasciâ suturali luteâ latâ ornato, spirâ conico depressâ, albâ seu luteo tinctâ, acutâ, aperturâ semirotundâ, intùs albido cinerascente, columellâ alba, rectiusculâ, in medio subconvexâ basi crassâ et obliquè rectâ, supernè callosâ, umbilico patulo albo, spirali, in canalem latum extùs desinente, canali intùs subangulato externè costulâ convexiusculâ, basin versus sensim crescente superne in umbilicum decurrente, funiculo semiovato plano intùs convexiusculo*

Var β *Testâ aurantio rufescente*

*Hab* 'Moluccas' H Cuming

*Natica Cumingiana* valdè affinis, basi columellæ crassiori extùs obliquè truncata, angulo externo umbilici costæformi, rotundato, obtuso et in perforatione decurrente, angulo interno canalis majore et depressiore apertura semirotunda, anticè dilatata sed non oblonga, et supernè auctâ differt

20 NATICA SALANGONENSIS *Nat testâ ovatâ seu oblongâ, cæruleo-fuscâ seu fulvâ, substriatâ, anfractibus quaternis depresso-convexis, supernè conicis et zonâ aurantiâ marginatis, spirâ conicâ, obtusiusculâ, pallidè cærulescente et albo fasciatâ, aperturâ semirotundâ, fulvo-castaneâ, columellâ rectâ, in medio vix convexâ, suprà crassâ, supernè angulo transverso calloso instructâ, ad umbilicum sulco notatâ, umbilico profundo, coarctato fulvo aurantio, canali arcuato largo, funiculo supernè oblongo, basi sensim attenuato modificato*

*Operculum pallidè fulvum, radiatim striatum, tenue, et cartilagineum* Naticæ mamillaris, *Lamk* (Natica fuscata, *nobis*) *proxima sed diversa*

*Hab* “Salango, West Colombia, found in sandy mud” H Cuming

21 NATICA PYRIFORMIS *Nat testâ oblongo pyriformi, lacteâ, substriatâ, nitidâ, anfractibus 5–6 convexiusculis, elongatis supernè declivis infimo ventricoso-conico, superne depresso, spirâ elongatâ conicâ, apice puncto fusco-notatâ, aperturâ obliquâ, subsemilunari, angustatâ, columellâ rectiusculâ, extùs superne callosâ, basi cum funiculo suprà compresso consolidatâ, umbilico parvo, externè occultante et canali arcuato profundo angustante, labio tenuiusculo subpellucido*

*Spirâ interdum supernè lutescente Anfractus ultimus sæpè tenuiter striatus striis inter oculum et lumen hyalinis*

*Hab* “Ilo-Ilo, island of Panay, found on the sand at low water,” H Cuming “and from Huan river, Australia, found in sandy mud by Lieut Collie, R N, ten fathoms”

22 NATICA AURANTIA, Lamk

Var β *Lutea seu straminea,* Nerita mamilla, *var* lutea, *Linné, Mus Lud Ulr p* 675 no 386 Natica straminea, *nobis olim* Natica sulphurea, *quorundam*

*Hab* “Philippines, found on the reefs” H Cuming Var β Amboina, Timor (Mus Paris)

B *Umbilicum nudum, pervium, nec funiculatum*

* *Testa subglobosa, operculum cartilagineum*

23 NATICA VIOLACEA, Sowerby, Tankerville Catal

*Natica amethystina,* Lamarck's collection

Var β *Testâ globoso ovatâ, ventricosâ, albâ seu lacteâ, maculis luteis seu dilutè chocolatis superioribus characteriformibus, medianis quadratis, inferioribus oblongis quinque seriatis pictâ, columellâ intùs et extùs pulchrè roseo-violaceâ*

*Hab* “Island of Ticao, Philippines, found in coral sand at four fathoms Var *a* from the island of Masbate, Philippines, sandy mud” H Cuming

24 NATICA BURIASIENSIS *Nat testâ parvulâ, ventricoso-globosâ, subepidermide luteo-olivaceo albâ, nitidâ, lævigatâ, lineis luteis longitudinalibus undulatis crebris, interdum maculis albis majoribus*

*supernè et in medio ventris subtriseriatis pictâ, spirâ parvâ, subconicâ acutâ, aperturâ semirotundâ, in fundo violaceâ, columellâ rectâ, basi crassiusculâ supernè callosâ, callo fusco-rubente, suprà umbilicum parvum, externe reflexum, curvum, et angulatum, partim occultante*

Var β *Testâ ad suturam fasciâ albâ, latâ, spiram decurrente pictâ, spirâ apice fusco violascente*

*Operculum testaceum, album, striis obsoletis ornâtum, postice margine tenuiter crenatum, antice lineâ elevatâ cinctum, apicem versus lævissimè callosum*

*Natica intricata* (*Nerita intricata*, Donovan) *minor, minus globosa, umbilicus nec funiculatus differt*

*Hab* "Island of Burias, Philippines, found in sandy mud at seven fathoms" H Cuming

25 Natica Raynoldiana *Nat testâ subglobosâ crassiusculâ, tenuissimè et densè striatâ, albâ seu dilute aurantio-fulvâ, spadiceo trifasciatâ et sæpè reticulatâ, anfractibus spiræ depresso-convexis, infimo rotundato, spirâ depresso-conicâ, subacutâ, fuscâ, aperturâ semirotundâ, albâ, columellâ subrectâ utrinque arcuatâ, supernè callosa incrassatâ, callo albo, umbilicum extùs albo-zonatum partim occultante*

Var β *Testâ dilute aurantio fulvâ, spadiceo trifasciatâ nec reticulatâ*

Var γ *Testâ albâ seu albidâ maculis spadiceis triserialis cinctâ interdum lineis reticulatâ, seu lineis confluentibus subflammulatâ*

Var δ ? *Testâ globoso-ovatâ, albâ seu pallide aurantiâ, lineis reticulatis pictâ, nec fasciatâ*

An *Nerita arachnoidea*, Gmelin, p 3674 no 17 ? Chemnitz, Conch v pl 188 fig 1915, 1916, optima (Mus Paris), non *Natica arachnoidea*, Lamarck (*Natica cruentata*, var *trifasciata*, nobis)

*Hab* "Zanzebar, East Africa, found on the sands by Mr T Thorre Cagayan province of Misamis, island of Mindanao, found on sandy mud" H Cuming Trincomalee, bay of Ceylon, by M. Raynaud (Mus Paris) Var δ patriam ignoro

26 Natica gallapagosa *Nat testâ globoso-acutâ, subepidermide dilute olivaceo-albâ, fasciâ largâ carneo-rufescente aut viridescente, supernè fasciâ pallidè rufâ cinctâ, anfractibus quinis subplanis infimo ventricoso, supernè declivi, planiusculo, spirâ parvulâ, conico-depressâ, rufo-fulva, acutâ, aperturâ semirotundâ, albâ, obliquâ, columellâ obliquè rectâ, supernè calloso-angulatâ, ad umbilicum parvum, partim occultante reflexâ*

*Operculum cartilagineum, olivaceo-fuscum tenuissimè radiatim striatum aperturâ testæ minus*

*Hab* "Gallapagos Islands, found in coral sand at Albemarle island" H Cuming

27 Natica pisiformis *Nat testâ minimâ, subglobosâ, albido-viridescente, subpellucidâ, anfractibus depressis, infimo ventricoso, superne sæpius subanguloso, lævigatis, spirâ depresso conicâ seu planulatâ, vix exsertâ, aperturâ semirotundâ, columellâ rectâ,*

*supernè brevè reflexâ, adnatâ, umbilico punctiformi, subfuniculato Operculum cartilagineum, tenuiter radiatim striatum lutescens, in medio rubicundum? Tale ego vidi in aperturâ eâdem testæ*

*Hab* "Valparaiso, Chili, found in coarse sand at forty-five fathoms" H Cuming

*** Testâ ovato-acutâ, tenuiusculâ, sæpissimè zonatâ, columellâ nigro aut fusco-purpurascente pictâ, operculo cartilagineo, oblongo, aperturâ angustiorè*

28 NATICA ZANZEBARICA *Nat testâ ovato-oblongâ, tenui subepidermide olivaceo-albâ, maculis fusco purpureis elongatis interdum confluentibus trifasciatâ, anfractibus senis convexis, tenuiter et crebrè striatis penultimo maculis bifasciato, infimo ovato, spirâ conico-acutâ, albâ, apice fusco, minimo, aperturâ ovato-acutâ, columellâ suprà umbilicum adnatâ reflexâ, fusco-purpurascente, anticè vix arcuatâ, umbilico profundo, extus partim occultato*

*Hab* "Zanzebar" Mr Thorre

29 NATICA PRIAMUS *Nat testâ ovato acutâ ventricosâ, nitidissimâ, tenuè striatâ, zonâ pallidiore in medio cinctâ zonâ lateraliter maculis spadiceis seriatis, sæpiùs remotis et quadratis marginatâ, spirâ parvâ, conico-acutâ, maculis fasciatâ, apice albo et puncto fusco notato, aperturâ ovatâ, basi et anticè dilatatâ, albido fuscâ, columellâ suprà umbilicum adnatâ, chocolatâ, subarcuatâ, externè in medio albo unimaculatâ et reflexâ, umbilicum profundum zonâ extùs decurrente rufâ partim occultante, funiculo valdè depresso, vix conspicuo, in umbilicum continuato*

Var β *pallidiore*

*Hab* "Moluccas," H Cuming Isle of France, M Le Colonel Mathieu (Mus Paris)

*Natica maura*, Lamarck's Encyclop, Sowerby, Tankerville Cat, *proxima sed major, ventricosior, tenuior, fasciata, columella tenuior valdè differt*

30 NATICA SAMARENSIS *Nat testâ ovato-acutâ albido et cærulescente longitudinaliter pallidè zonatâ, fusco spadiceo transversim quadrifasciatâ fasciarum maculis interdum flammæformibus aut confluentibus, spirâ conico acutâ, albo cinctâ, aperturâ ovatâ, spadiceo-flammulatâ, columellâ omninò rufo-fuscâ, subrectâ, basi obtusè emarginatâ, supernè reflexâ, suprà umbilicum externè auctâ, umbilico fere tecto, intùs spadiceo*

*Operculum cartilagineum, tenuiter radiato-striatum, angulo circulari in medio notatum, luteo-fuscescens, aperturâ testæ multò minus*

*Hab* "Catbalonga island of Samar, Philippines, under stones at low water" H Cuming

*Natica Simiæ*, Deshayes in Lamarck, An s vert viii p 652 no 45 (Lister, Conch pl 142 f 36 *Ner fasciatus e museo Oxoniensi*), *proxima, sed major, solidior, fasciis dissimilibus, columellâ omninò rufo-fuscâ differt*

31 NATICA SEBÆ, Souleyet, Voy Bonite, pl 35 fig 6, 7 optime, Seba Mus, iii pl 41 f 21 optima

Var β *Testâ tenui, subepidermide stramineâ, exalbidâ, anfractibus supernè lacteo marginatis, columella et umbilico rufo-fuscis*

*Operculum tenue, rubrum, longitudinaliter creberrimè transversim radiatim valdè striatum*

*Hab* "St Nicolas, island of Zebu, Philippines, found under stones This species is remarkable for the smallness of the operculum, the animal covers a part of the shell when at rest" H Cuming

Var β Loon, isle of Bohol, Philippines, found under stones" H Cuming

## GEOLOGICAL SOCIETY*

Nov 1, 1843 —The following communications were read —

1 "On the Fossil Remains of Star-fishes of the Order *Ophiuridæ*, found in Britain" By Prof Edward Forbes

After enumerating the several *Ophiuridæ* recorded as British fossils the author described four new species, viz 1 *Ophioderma tenuibrachiata* and 2 *Ophiura Murravi* discovered by Dr Murray in the lias near Scarborough, 3 *Amphiura Prattii* discovered by Mr Pratt in the Oxford clay, and 4 *Ophiura cretacea* communicated by Mr Tennant, from the chalk The animals of this order appear to have commenced their existence in the earliest periods of organic life and to have continued to the present day without any great modifications of form of family or generic value They seem at present to be much more numerous than at any former period None of the fossil species is identical with the existing

2 'On the Geology of Malta and Gozo' By Lieut Spratt, R N, Assistant Surveyor H M S Beacon

The formations composing these islands are tertiary and appear, from the author's researches, to belong to one geological epoch They are all of marine origin, and very regularly deposited in parallel strata, but little inclined from the horizontal They may be grouped under four divisions —1 Coral limestone, 2 Yellow sandstone and blue clay, 3 Yellow and white calcareous sandy freestone, and 4 Yellowish white semi-crystalline limestone Each of these groups is characterized by peculiar fossils, some of which are common to more than one By a careful examination of the organic remains in each, the author was enabled to detect several extensive faults in both islands These displacements amount generally to about half the present height of the islands above the sea, viz about 300 feet and the direction of the faults is transverse to the line of elevation or the direction of the islands, that is, N E and S W, the chain of islands running N W and S E Advantage of the irregularities of surface caused by these faults has been taken in constructing the military defences of the island The author concludes with a detailed account of the several strata and their subdivisions, describing the distribution of the contained fossils, a collection of which accompanied the paper

Nov 15 —The following papers were read —

1 "On some Fossil Remains of an Anoplotherium, and two species of Giraffe, from the tertiary strata of the Sewalik Hills in India" By Dr Falconer and Capt Cautley

The Anoplotherium is an undescribed species, differing from those of the Paris basin, and much larger, its size being between that of the horse and of the Sumatran rhinoceros. It is founded on two upper jaws, with the near molars perfect. It is a true Anoplotherium, as distinguished from the subgenera of *Xiphodon* and *Dichobune*. The discoverers have named it *Anoplotherium Sivalense*. The remains were dug out of a bed of clay in the tertiary strata of the Sewalik hills mixed up with bones of Sivatherium, *Camelus Sivalensis*, Antelope, Crocodile, &c. The authors describe two species of giraffe. The first, which they designate *Camelopardalis Sivalensis*, is founded on the third cervical vertebræ of an old animal, and they infer it to have been one third smaller than the existing species. The bone is very perfect and completely silicified. It measures 8 inches, while the same vertebra of the existing species is 11½ to 12 inches. The bone is more slender in its proportions than the existing one, and exhibits a series of specific differences in addition to the size. The second species they name *Camelopardalis affinis* provisionally, from its close resemblance to the existing Cape Giraffe, in form and size of teeth, &c. The species is founded on two fragments of the upper jaw with the back molars, and a fragment of lower jaw containing the last molar. The dimensions agree to within the tenth of an inch with those of a female head in the Museum of the College of Surgeons. The giraffe bones were found along with those of Anoplotherium, Camel, *Crocodilus biporcatus*, &c., in a clay bed in the Sewalik hills.*

2. Prof. Sedgwick commenced the reading of a paper in continuation of his former memoir "On the Geology of North Wales," and described a section across the Berwyns.

## ASHMOLEAN SOCIETY.

*Oxford*, June 3.—Prof. Twiss read a paper in illustration of a collection of specimens of the Ova and Fry of the Salmon, presented to the Ashmolean Museum by Mr. A. Young, the manager of the Duke of Sutherland's fisheries on the river Shin, in Sutherlandshire. The collection consists of thirteen specimens of the ova, selected at intervals varying from twenty to one hundred and thirty-three days from the time of their being deposited, and ten specimens of the young fry from the day on which they were hatched, the one hundred and thirty-fifth after impregnation, to the time when they assume the silvery character of the smolt and descend to the sea, which in this case was one year and nine days after exclusion from the egg. The experiments of Mr. Young, which have now been carried on through a period of three years with the greatest care, confirm the previous observations of Mr. Shaw, in the Nith river in Dumfriesshire, in their general bearings, with such slight variations as the different characters of the respective rivers may account for. Mr. Young has ascertained that the average period required for hatching the ova of the salmon of the Shin river varies from one hundred to one hundred and forty days, according to the greater or less warmth of the weather Mr Young considers that the fish passes through the condition of parr, whose characteristics are the transverse bands, and assumes the silvery appearance of the smolt in about twelve months from the time of being hatched, and he is disposed to think, that some of the young fish which have been deposited as ova, and therefore hatched late in the season, do not assume the smolt appearance nor go down to the sea at the end of the first year Prof Twiss called attention to the importance of these observations in connexion with the preservation of the young fish, which have hitherto not unfrequently been taken and destroyed, as if a distinct species of trout, to the increased facility of propagating peculiar breeds or races of fish, by transporting the ova, when impregnated, in water from one river to another, and to the great value of careful notices as to the spawning-seasons of the fish of different rivers, in connexion with a more discriminating system of legal regulations as to the fence months Dr Buckland gave some account of his visit to the experimental ponds at Drumlanrig in company with Prof Agassiz, who was himself conducting a series of analogous experiments on the trout of the lake of Neufchatel He alluded to the great probable advantages of hatching the ova in artificial ponds, with a view to the preservation of the young fry In the experiments of Agassiz, and Sir F Mackenzie Bart it was found necessary to feed the young fry with the paunches of sheep

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* The first announcement of the fossil remains of the Giraffe was made by Capt. Cautley in the Journal of the Asiatic Society of Bengal, vol. vii. p. 658 (15th July, 1838).

Prof Twiss afterwards read a letter from Mr Young of Invershin Bonar Bridge N B, respecting the propagation of Eels The following are the more important conclusions —The adults spawn in the summer months, in sand and gravel banks in the rivers and do not descend to brackish water to deposit their spawn The spawn becomes vivid in the following September and October, but remains under the gravel, in the spawning-beds, until the following April or May, depending entirely upon the heat and cold of the weather, and the adult eels, in place of emigrating get into holes in the banks of the rivers, and underneath large stones, as soon as the water turns cold and remain stationary until the warmth of summer again heats the water of the rivers

## MISCELLANEOUS

### DESCRIPTION OF A NEW SPECIES OF CUSCUTA

The following description of a new *Cuscuta* by Dr L Pfeiffer of Cassel, occurs in the 'Botanische Zeitung' of Oct 13 1843 As some of the plants on which it is found are common with us, it is not improbable it may be met with in this country

*Cuscuta hassiaca* Pfr Caule ramoso, floribus irregulariter *fasciculatis, pedunculatis*, fasciculis et floribus singulis bractea fultis, calyce campanulato 5-fido, tubo corollæ campanulato, limbum æquante, squamis convergentibus clauso 5-fido laciniis expansis, apice subcorniculato inflexis stamin 5 anthera brevioribus, stylis 2 filiformibus, *stigmatibus capitatis*

This plant was collected on a very dry and sunny bank near Cassel, parasitical on *Anthemis Cotula, Barkhausia fœtida, Sonchus asper, Galium verum, Torilis nodosa*, &c., sometimes twining round them and adhering by lateral tubercles like *C. Europæa*, and at others lying detached in dense yellow masses on the ground. It is distinguished by its pedunculated flowers and capitate stigmas from all the other German Cuscutas. On referring to Dietrich's 'Synopsis' (1840) Dr. Pfeiffer found the characters of *C. Americana*, Pers., to come pretty near to it, but to differ in the umbellate flowers. From the Bengal *C. sulcata* Roxb., it is distinguished by the absence of the furrows in the calyx, &c. The orange-yellow colour of the stems renders it very conspicuous when growing in any quantity.—A. HENFREY.

## *Observations on the Habits of the* Python Natalensis. By Thomas S. Savage, M.D., of Cape Palmas, Western Africa.

This serpent when spoken of by travellers and residents has been erroneously called 'Boa,' and thus confounded with the South American genus. There is a striking similarity, however, between the two, both in structure and habits, so that were it not for the arrangement of the subcaudal scales, one would be identified with the other.

During my residence here, which has been five years, I have seen a number of individuals of the serpent, but one however alive, which is the specimen I now send.

The first of which I had any authentic account was one that appeared on the Mission premises of the A. B. C. F. Missions. The facts in the case have been kindly furnished by my friend the Rev. J. L. Wilson. He informed me that it was attracted into the yard by a dog. He says in answer to my inquiries: "He was 14 feet long, and held the dog not more than two minutes before the natives came to his relief. I suppose that the snake had stretched himself across the path, and seized the dog in the act of jumping over him. I was too much frightened to observe what was the shape of the snake while he held the dog in his folds. I am inclined to think that he had nothing to fasten his tail to while he held the dog. None of the bones of the dog were broken, and I am inclined to think that he received no injury whatever.

"The snake did not let go his hold till he had received a fatal blow from a bill hook. The dog then leaped up suddenly several times, as if he were not sure of having been extricated, ran around and entered the back-yard, but for some time appeared afraid of everything and everybody. His back only was *slimed*, and this could not be washed off, but gradually wore away in the course of a week or ten days."

The next individual of which I have heard was attracted into the house of a colonist, an old woman, by a hen and her chickens. An unusual noise was heard under the bed in the night, which awakened the woman. By a light she discovered the serpent in the act of seizing its prey; affrighted, she fled to the house of a neighbour, who came and captured him with his gun.

The third individual appeared upon my own premises early in 1837. An antelope was discovered by some workmen a short distance from my house Upon the first sight, the natives as usual raised a cry, when he suddenly disappeared among the bushes They started in pursuit But a few moments elapsed before they heard a cry from the antelope which directed them to the spot, where they beheld the animal struggling in the folds of a large Python They all fired simultaneously, and shot at the same instant both the serpent and its victim The former I measured and found it over 14 feet The antelope was a large one, and it was difficult to believe that it could have been received through the throat of the serpent, comparatively so small The head had been cut off and the body greatly mutilated before I saw it, but taking a section of the skin where the abdomen begins to expand above the vent, and not including the greatest volume, I stretched it moderately It was very easily distended, and I soon satisfied myself, that without going beyond the natural power of expansion, it would have taken the body of the antelope

It was skinned by the natives and the flesh when denuded was of the most delicate white It was divided among them, and not a particle, whether of skin or any other part was lost All was carried home, cooked and eaten From the skin was made a soup I was extremely disgusted at the sight of a man carrying off in his hand, with an air of great satisfaction a string of the intestines This and other serpents are eagerly sought by the natives for food

I have seen two other individuals in the course of the present year they were captured by natives who were clearing up their land for rice-farms They were much mutilated by transverse gashes from these ‘ bill hooks ” Three more, I was informed were found upon the same piece of land, which led the individual to abandon it, from the superstitious notion that it could not yield a crop

The next specimen is the one before me It measured 10 feet in length, is young, and was captured on the 22nd of February by my associate, the Rev Joshua Smith on the premises of one of our *out-stations* His account, in answer to my inquiries, is as follows “I had retired for the night, but was wakeful and unable to get to sleep About twelve o clock I heard Fanny (a favourite dog) barking violently in the girls school house The barking soon ended in a cry of distress I thought it probable that a leopard had attacked her, as they often do carry off dogs and other domestic animals I went down and walked around the house where there was a hole, affording Fanny ingress and egress The moon shone brightly, but I could not see the cause of trouble nor hear any noise I called the dog by name but she did not appear, nor could I hear anything except what I thought to be the hiss of some ducks that were shut up there I opened the door, but still I could see nothing I then went back to my chamber for a lantern, and returning opened again the door, when I discovered the dog in the folds of a serpent with her back downwards, and seemingly motionless I went back to my chamber for a weapon, and finding only a country dagger, I returned accompanied by some men, and entered the school house again with the lantern in my hand The serpent was coiled twice or thrice around the dog, his tail grasping the foot of a bench, and his jaws fastened on her throat His motion in compressing his prey may be compared to that of a cord when tightened around anything, and some one pulling first at one end and then at the other I thought it best to thrust the dagger into the snake as near the head as possible, but as that was hidden by the bench I could not see it and I made a thrust through the lungs It started and Fanny was thrown from its folds with a jerk when its aim was to retreat by the way it had entered I then withdrew the dagger and thrust it into the snake further back, so as to hold him till the men on the outside could disable him As his head appeared they beat him with sticks, so as to prevent him from running away entirely "

To the above I will add, that Mr Smith displayed great fearlessness on the occasion, for though there were on the spot a number of men both colonists and natives yet not one could be induced to follow him into the house An attack from the serpent might have been apprehended, for he was evidently in a state of extreme hunger

The general habit of this serpent in seeking for its prey is to lie in ambush near a frequented path or watering-place, and suspended from a tree or with its tail fixed to some other object, suddenly dart upon the unwary animal The attack is so sudden and violent that the victim is often prostrated and stunned, and then begins the dreadful process of constriction A bullock was so much injured in a recent attack, as to be supposed beyond the possibility of recovery

In making the onset, it is not always necessary that the tail should be coiled around a fixed object The hooks or claws near the anus are sometimes protruded, it is said (and the evidence is wholly satisfactory), and inserted in the ground or under roots thus affording a fulcrum which gives inconceivable force to the blow

These horny processes or rudimental feet as they have been called, are also serviceable in ascending trees they are inserted into the ground and bark of the tree, constituting fixed points which greatly facilitate the ascent We have satisfactory testimony in proof of another habit that I have never seen mentioned, in which these hooks must be highly serviceable It is said that in fields more or less open they often raise their heads above the surrounding grass and shrubbery in search of prey, their application then in this act must be evident protruded and penetrating the ground beneath the roots they must afford great support to the body In this position birds have been known to attempt to alight mistaking it in its motionless attitude, for a stick or stump, and thus to have fallen unwarily into its distended jaws

Instances of its attack upon men are very rare, and never, probably, except when it is in a state of extreme hunger

The natives fear them single handed, but not in numbers They seek them for food, esteeming them very highly on their *bill of fare*

Its places of resort are streams and damp places Almost all animals constitute its prey It is not poisonous, as is well known Its constrictive power is all that renders it formidable —*From the Boston (U S) Journ of Nat Hist* vol iv No 2

### ON THE PLACE OF ISOETES IN THE SYSTEM

Following the opinion of C Richard, M Bory de St Vincent considers that the Linnæan genus *Isoetes* has such distinct characters that it must be regarded as a natural family, to this it has been objected, that it would be unadvisable to increase the number of families by forming one containing only one or two species

The *Isoetes* are certainly not ferns, neither can they be classed with the *Lycopodiaceæ* as some have proposed In the flora resulting from the botanical explorations of the scientific commission of Algeria the family of the *Isoetaceæ* has not only been firmly established, but at least two or three species have been added

In the first instance only two *Isoetes* were known, both aquatic, the *lacustris* of the north, and *I Coromandelia* of Hindostan Prof Delile found the *Isoetes* of the pool of Grammont near Montpellier so different from the *lacustris* of Linnæus that he has characterized it as a new species under the name of *I setacea* It is essentially southern, and has been found by Dr Mogent in the Geradmer, an elevated lake of the Vosges Subsequently a fourth *Isoetes* was found in Brazil and several others have been found in N America, New Holland and the islands of the Pacific Those which have been found in Algeria are of two kinds and might be separated into two very distinct subgenera the first composed of two or three species, like all previously known *Isoetes* aquatic the second of two terrestrial species, which instead of growing at the bottom of lakes are found in the driest and most exposed parts of the country The *Isoetes* of Algeria are—*Aquaticæ 1 *I setacea* Del *α Delilei β Peyremondii* 2 *I longissima* (n sp ) **Terrestres 3 *I Duriei* (n sp ), and 4 *I hystrix* (n sp )—*Comptes Rendus*, June 24 1844

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## METEOROLOGICAL OBSERVATIONS FOR JUNE 1844

*Chiswick*—June 1 Clear and fine 2 Overcast and cold fine cloudy 3 Light clouds and very fine 4, 5 Very fine 6 Slight rain cloudy 7 Overcast boisterous 8 Very fine 9 Slight rain very fine 10 Fine cloudy 11—16 Very fine 17 Hot and dry cloudy 18 Rain fine 19 Overcast heavy clouds with showers 20 Overcast 21, 22 Very fine 23 Exceedingly clear sultry 24 Cloudy hot and sultry 25 Constant heavy rain 26 Cloudy fine 27 Cloudy 28 29 Very fine 30 Dry haze overcast and fine —Mean temperature of the month 2° 19 above the average

*Boston* —June 1 Fine 2, 3 Cloudy 4 Fine 5 Cloudy 6 Rain early A M rain A M 7 Cloudy 8 Cloudy thermometer at 4 o clock 75° 9 Cloudy 10 Fine rain A M 11 Fine 12 Fine thermometer 4 o clock 75° 13 Fine stormy all day 14, 15 Stormy 16, 17 Fine 18 Cloudy 19, 20 Cloudy rain A M and P M 21 Cloudy 22 Fine 23 Fine thermometer at noon 81° 24 Fine rain early A M, with thunder and lightning thermometer at noon 80° 25 Cloudy rain A M and P M 26, 27 Cloudy 28—30 Fine

*Sandwick Manse, Orkney* —June 1 Cloudy 2, 3 Bright cloudy 4 Showers cloudy 5—7 Showers rain 8 Bright cloudy 9 Cloudy showers 10, 11 Bright drops 12 Bright rain 13 Showers bright 14, 15 Showers 16 Bright clear 17 Clear 18 Drizzle 19 Drizzle drops 20 Showers drops 21 Clear 22 Fog 23 Drops clear 24 Hazy clear 25 Clear cloudy 26, 27 Cloudy 28 Cloudy damp 29, 30 Cloudy

*Applegarth Manse, Dumfries-shire* —June 1 Dry and withering 2 Dry and withering cloudy 3 Fine 4 Cloudy and threatening rain 5, 6 Rain 7 Very wet 8 Fair, but cloudy 9 Fair threatening 10 Showers 11 One slight shower 12, 13 Heavy rain 14, 15 Fair 16 Fair and fine 17, 18 Rain 19 Fair 20, 21 Rain 22 Fair 23 Fair and warm thunder 24 Rain 25 Showery 26—30 Fair and fine

| | |
|---|---|
| Mean temperature of the month | 55° 1 |
| Mean temperature of June 1843 | 54 7 |
| Mean temperature of spring water | 51 6 |
| Mean temperature of ditto June 1843 | 50 7 |

[illegible]

BOSTON, *by the* Rev W Dunbar *at Applegarth Manse,* DUMFRIES SHIRE, *and by the* Rev C Clouston, *at Sandwick Manse* ORKNEY

| Days of Month | Barometer | | | | | | | Thermometer | | | | | | | | Wind | | | | Rain | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chiswick | | Boston 8¾ a m | Dumfries-shire | | Orkney Sandwick | | Chiswick | | Boston 8¾ a m | Dumfries shire | | Orkney Sandwick | | Chiswick 1 p m | Boston | Dumfries shire | Orkney Sandwick | Chiswick | Boston | Dumfries-shire | Orkney Sandwick | |
| 1844 June | Max | Min. | | 9 a m | 9 p m | 9¼ a m | 8¼ p m | Max | Min | | Max | Min | 9¼ a m | 8¼ p m | | | | | | | | | |
| 1 | 29 998 | 29 949 | 29 55 | 30 06 | 29 97 | 30 11 | 30 13 | 72 | 44 | 57 | 67 | 44 | 56 | 45 | ne | calm | ene | w | | | | |
| 2 | 29 971 | 29 953 | 29 50 | 29 98 | 29·96 | 30 14 | 30 14 | 61 | 41 | 52 5 | 58½ | 46½ | 48 | 40 | ne | calm | e | nw | | | | |
| 3 | 30 123 | 30·057 | 29 55 | 30 00 | 30 00 | 30 04 | 30 00 | 69 | 41 | 53 | 64½ | 44 | 50 | 48 | e | calm | se | w | | | | |
| 4 | 30 147 | 30 057 | 29 60 | 29 94 | 29 86 | 29 92 | 29 93 | 79 | 40 | 60 | 64 | 41 | 50 | 46 | sw | calm | sw se | w | | | | 20 |
| 5 | 29 976 | 29 882 | 29 39 | 29 69 | 29 60 | 29 80 | 29 63 | 79 | 53 | 64 | 58½ | 52 | 49 | 48 | sw | calm | se sw | se | 06 | | | |
| 6 | 29 834 | 29 714 | 29 05 | 29 50 | 29 55 | 29 69 | 29 69 | 70 | 53 | 58 | 64 | 53 | 55 | 54 | sw | sw | se sw | s | 02 | 08 | | 16 |
| ☾ 7 | 29 901 | 29 862 | 29 22 | 29 56 | 29 40 | 29 57 | 29 60 | 71 | 50 | 63 | 60½ | 52 | 56 | 53 | sw | sw | s | sw | | 11 | 1 02 | ·22 |
| 8 | 30 057 | 30 001 | 29 32 | 29 78 | 29 81 | 29 72 | 29 78 | 80 | 49 | 66 | 65 | 52 | 50 | 53 | sw | w | s | sw | 02 | | | 30 |
| 9 | 30 009 | 29 983 | 29 29 | 29 78 | 29 80 | 29 74 | 29 73 | 80 | 51 | 63 | 61 | 52 | 62 | 53½ | w | calm | sw | wsw | 01 | | | |
| 10 | 30 110 | 30 034 | 29 43 | 29 77 | 29 90 | 29 71 | 29 78 | 77 | 41 | 63 5 | 60 | 47 | 60 | 53 | w | calm | wsw | wsw | | | | 24 |
| 11 | 30 186 | 30 143 | 29 63 | 30 00 | 30 00 | 29 92 | 29 97 | 83 | 42 | 65 | 63 | 45 | 52½ | 52 | sw | w | wsw | sw | | 16 | | 08 |
| 12 | 30 166 | 30 080 | 29 55 | 29 96 | 29 78 | 29 90 | 29 62 | 82 | 56 | 66 | 63½ | 50 | 53½ | 50 | sw | w | sw | wsw | | | | 18 |
| 13 | 30 003 | 29 940 | 29 28 | 29 56 | 29 63 | 29 45 | 29 30 | 85 | 52 | 70 | 66 | 53 | 58 | 49 | sw | w | wsw | sw | | | | 22 |
| 14 | 30·030 | 29 999 | 29 35 | 29 68 | 29 74 | 29 93 | 29 50 | 75 | 49 | 63 5 | 58½ | 48½ | 47½ | 48½ | w | n | w w | w | | | 0 42 | 39 |
| 15 | 30 046 | 30 009 | 29 42 | 29 80 | 29 92 | 29 71 | 29 92 | 78 | 43 | 58 | 57 | 47 | 47 | 46 | w | nw | wnw | nw | | | | 18 |
| ● 16 | 30 197 | 30 168 | 29 64 | 30 05 | 30 08 | 30 04 | 30 11 | 78 | 40 | 62 | 65 | 42 | 50 | 48 | nw | calm | wnw | nw | | | | |
| 17 | 30·153 | 29 925 | 29 67 | 30 03 | 29 83 | 30 08 | 30 03 | 77 | 52 | 64 | 57½ | 45½ | 55 | 50 | s | calm | sw | w | 04 | | | |
| 18 | 29 757 | 29 676 | 29 28 | 29 72 | 29 70 | 30 00 | 30 00 | 77 | 54 | 57 | 53½ | 49 | 49½ | 47 | e | calm | n | ne | 05 | | | |
| 19 | 30 014 | 29 858 | 29 35 | 29 84 | 29 86 | 29 98 | 29 92 | 66 | 46 | 59 | 52 | 46½ | 45 | 46 | nw | calm | nw | n | 02 | | | 10 |
| 20 | 30 041 | 29 972 | 29 54 | 29 80 | 29 70 | 29 79 | 29 75 | 74 | 53 | 56 | 53½ | 40½ | 49½ | 48 | w | calm | s | w | 01 | 08 | | 05 |
| 21 | 29 980 | 29 761 | 29 42 | 29 67 | 29 60 | 29 71 | 29 70 | 83 | 52 | 63 5 | 63½ | 53½ | 51½ | 49 | sw | calm | sw | w | | 09 | | |
| 22 | 29 797 | 29 769 | 29 19 | 29 55 | 29 68 | 29 63 | 29 73 | 86 | 48 | 66 | 64½ | 51 | 55 | 53 | sw | calm | s | ese | | | 1 46 | |
| ☽ 23 | 29 789 | 29 742 | 29 25 | 29 70 | 29 69 | 29 78 | 29 82 | 91 | 63 | 73 | 71½ | 54 | 55 | 55 | s | calm | s | e | | | | |
| 24 | 29 651 | 29 642 | 29 04 | 29 61 | 29 62 | 29 88 | 29 90 | 89 | 67 | 73 | 69 | 58 | 52 | 50 | sw | calm | ne | ese | | 13 | | |
| 25 | 29 666 | 29 613 | 29 00 | 29 66 | 29 69 | 29 95 | 29 91 | 65 | 47 | 62 | 59 | 53 | 52 | 47½ | sw | calm | ne | ne | ·62 | 05 | | |
| 26 | 29 784 | 29 718 | 29 26 | 29 80 | 29 77 | 29 90 | 29 92 | 67 | 51 | 59 | 55½ | 46 | 48½ | 47 | n | calm | ne | ne | 12 | 79 | | |
| 27 | 29 886 | 29 828 | 29 39 | 29 85 | 29 80 | 29 92 | 29 90 | 68 | 50 | 55 | 60 | 17 | 47½ | 48½ | n | calm | s | n | | | | |
| 28 | 30 016 | 29 949 | 29 50 | 29 97 | 29 90 | 29 94 | 30 00 | 74 | 47 | 58 5 | 67½ | 46 | 51 | 48 | w | calm | e | n w | | | | |
| 29 | 30 065 | 29 926 | 29 57 | 29 70 | 29 94 | 30 02 | 30 04 | 83 | 54 | 63 | 67 | 48 | 52 | 50 | sw | w | ssw | nw | | | 0 53 | |
| ○ 30 | 29 936 | 29 850 | 29 47 | 29 90 | 29 79 | 30 00 | 29 96 | 79 | 50 | 65 | 67 | 47 | 50 | 47 | ne | calm | se | nw | | | | |
| Mean | 29 976 | 29 902 | 29 39 | 29 797 | 29 445 | 29 865 | 29 841 | 76 60 | 49 30 | 63 9 | 62 ¼ | 48 ¾ | 51 93 | 49 10 | | | | | 0 97 | 1 49 | 3 43 | 2 32 |

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

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## XVIII —*Some Observations on the Genus* Serpula, *with an Enumeration of the Species observed with the Animal in the Mediterranean* By Dr A Philippi*

[With a Plate ]

Few animals have been so much neglected by naturalists as the *Serpulæ*, frequent proofs of which assertion will occur in the course of these observations, it is on this account that I consider it advantageous to lay before the zoological public the results of my observations made on twenty-five species relative to the external structure of the animal, I shall reserve for a separate work more detailed descriptions, which will be accompanied by drawings

Linnæus, in the 12th edition of his ‘Systema Naturæ,’ p 1264, characterizes the genus *Serpula* thus “*Animal* Terebella *Testa* univalvis, tubulosa, adhærens (sæpe isthmis integris intercepta)” By the words “animal Terebella,” Linnæus, although he has admitted several species of *Vermetus* among *Serpula* from his being unacquainted with the animals, has nevertheless excluded Adanson’s *Vermetus* The words “sæpe isthmis integris intercepta” refer solely to the shell of *Vermetus*, and must therefore be excluded from the diagnosis Lamarck likewise adopts this false characteristic, but Blainville has correctly stated in the ‘Dict des Sciences Naturelles,’ vol xlviii p 550, that it is precisely in the absence of septa that the shell of *Serpula* differs from that of *Vermetus* My former supposition, that the shell of *Vermetus* possessed exclusively a porcellanous nature, while that of the species of *Serpula* was calcareous, I must now retract, having become acquainted with true *Serpulæ* with a vitreous shell

The true *Serpulæ* have been divided by modern zoologists into the following genera *Serpula*, Lamk , *Vermilia*, Lamk , *Galeolaria*, Lamk , *Cymospira*, Savigny, Blainville, *Spirorbis*, Lamk , *Filograna*, Berkeley, *Protula*, Risso, *Spiromella*, Savigny, Blainville The characters on which these separations are founded are of different value *Vermilia* and *Galeolaria* differ from *Serpula* solely by the structure of the operculum, according to Lamarck, *Serpula* possesses an 'operculum pedicellatum infundibuliforme aut clavatum (*corneum*)', for some lines further he says, "cette opercule, par conséquent, *n'est point calcaire*" (2nd ed An sans vertèbres, v p 361 ) *Vermilia*, on the contrary, has an 'operculum *testaceum* orbiculatum, simplex', and further on, '*à dos convexe, le plus souvent conique*' (Ibid p 368 ) *Galeolaria*, lastly, is said to possess an 'operculum testaceum compositum,' which, according to my observations however, does not consist of five to nine but of fifteen pieces, the number however may differ in the various species, at all events, the drawing in the 'Dict des Sciences Naturelles' is decidedly bad *Filograna*, Berkeley, is said to possess constantly two opercula, which has likewise been observed exceptionally in other species *Protula*, Risso, and *Spiromella*, Blainv, have no operculum Cuvier refers them curiously enough to *Sabella*

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* From Wiegmann’s Archiv, Part 2 1844 Translated by W Francis, Ph D

The genera *Cymospira* and *Spirorbis* have been established according to the number of filaments into which the branchiæ are divided and according to their arrangement In *Cymospira* the branchiæ are on each side divided into numerous filaments and rolled up spirally, in *Spirorbis* they consist only of three filaments, but these characters are of very slight value The different species of *Serpula* which I have observed with the animal have 3, 4, 6, 7, 8, 10, 11, 13, 18, 30, 40, and more filaments to each branchia, and the larger their number the more requisite is it for them to adopt a spiral arrangement I have likewise found in *Vermilia triquetra* and *Pomatoceros tricuspis* (see below), that the filaments of the branchiæ describe a spiral of one convolution of the kind represented ↄ when they are expanded It appears therefore to me that no very accurate limits exist between spiral and non-spiral branchiæ According to Blainville, the branchial filaments of the *Vermiliæ* have cirrhi only on one side, which I look upon as an error

The mode of growth has likewise been taken into consideration, and those species with a spiral growth have been referred to *Spirorbis*, yet the likewise remarkably spirally wound *S cereolus*, the animal of which is still unknown, is excluded One of the principal results of my observations is, that no relation exists between the nature of the animal and the shell, except perhaps in the genus *Galeolaria*, this indeed is a sad result thus, for instance, we have a *three-ridged* shell in three different sections, an *orbicular* shell in still more, in one division there are smooth orbicular, orbicular with longitudinal bands, triangular, quadrangular, &c

From what has been stated above, the structure of the operculum is the best character upon which to form the subdivisions of *Serpula*, this character has moreover the advantage that it may still be frequently observed in dried specimens preserved in museums The structure however of the operculum is far more varied than hitherto supposed, and several new subdivisions must be made, of which the following are the characters —

A Animal with opercula On each side of the neck *a short* membrane, *broad above* and *narrow beneath,* bearing seven fasciculi of bristles, the upper one being generally directed anteriorly (this structure is not known of *Galeolaria*) *Serpula,* Cuv

*a* Operculum *horny,* shallow or infundibuliform, *curved at the margin,* radiately striped above, supported on a subconical fleshy petiole *Serpula* in the restricted sense

*b* Operculum *calcareous, forming a shallow disc, margin entire. Placostegus,* Ph This operculum calls most to mind that of a gasteropod

*c* Operculum *calcareous, conical,* shortened or elongated, without appendage *Vermilia,* Lamarck

*d* Operculum *calcareous, hemispherical,* with appendages (which are interiorly hollow) *Pomatoceros,* Ph

*e* Operculum calcareous ? horny ? consisting of an elliptical shallow plate which supports on the hinder portion two ramified horns, but on the anterior margin uncinate bristles, the branchiæ are rolled up spirally *Cymospira,* Savigny, Blainv The *Serpula gigantea,* Gm, which forms this division, I am not acquainted with from the original essays of Pallas and Home, but only from Blainville's 'Dict' and from the copy of Home's figure given by Blumenbach (Abbildungen Naturhist Gegenstande, no 67)

*f* Operculum *horny,* almost as in *a,* but provided on the upper side in the centre with moveable points, which (at least in one species) are likewise horny *Eupomatus,* Ph

*g* Operculum calcareous? obliquely truncated?, shell small, always spirally wound?, branchiæ constantly? composed of few filaments, *Spirorbis,* Lamk. [The form of the operculum exhibited by the figure in the 'Dict des Sciences Nat' 1 fig 2 is, precisely as in *Placostegus,* different from the form which I have observed in another species ]

*h* Operculum *calcareous,* composed of very many pieces *Galeolaria,* Lamk

B No operculum The lateral membrane continued for half the length of the body, equally broad *Apomatus,* Ph

*a* Branchiæ spiral *Protula,* Risso, *Spiromella,* Blainv.

'Dict' xlviii p 560* [The description which Risso gives in his 'Hist de l'Eur Mérid' iv p 405 is quite romantic, and does not in the least agree with the statements of Cuvier in 'Règne Animal,' ed 2 vol iii p 192, whose description is exactly in accordance with my own observations, which will be detailed under *b* ]

*b* The branchiæ simply fan-shaped *Psygmobranchus,* Ph

I cannot agree with Cuvier in referring the last section, to which I have applied the name *Apomatus,* to *Sabella* I would not lay any great stress on the fact that the *Sabellæ* form a membranous or coriaceous tube, while *Apomatus* forms a calcareous one, but I consider of great importance the fact, that in the *Sabellæ* all the rings of the body are formed alike and are provided with similar bundles of bristles, while in *Apomatus,* precisely as in *Serpula,* the first seven fasciculi of bristles are fixed in a membranous expansion, of which not a trace was indicated in the *Sabellæ* observed by me

I will now pass on to the characters of the individual species

### 1 SERPULA, *L* (*sensu strictiori*)

1 *S echinata,* Gm, *testa* teretiuscula, protensa, flexuosa, rosea, transversim rugosa, carinis denticulatis, echinata Diam 2'''

*Animal* branchiis albo coccineoque fasciatis, filorum (in utraque) 30 et ultra, operculo rubro Gm p 3744, Gualt t 10 R, Martini, 1 f 8

2 *S pallida,* Ph, *testa* teretiuscula, protensa, flexuosa, pallide rosea, carina mediana conspicua, laterali utrinque obsoleta, striisque incrementi tenuibus subaspera Diam 1½'''

*Animal* branchiis albo coccineoque fasciatis, filorum pauciorum quam in antecedente, operculo albido

3. *S triquetra,* L ? *testa* triquetra, flexuosa, alba, altero, latere tota adnata Diam 2'''

*Animal* branchiis albo coccineoque fasciatis, filorum circa 30, operculo coccineo, crenis circa 24 (according to the drawing, I forgot to notice the number of folds)

I do not however think that is the Linnæan species Linnæus has not described the animal, and only saw small individuals, the subsequent citations of Baster, copied by Martini, Gualtieri and others, do not exactly correspond to my species, as they represent the shell much thinner It should also be observed, that the shells of *Serpula triquetra, Vermilia triquetra,* and *Pomatoceros tricuspis* are difficult to distinguish without the animals Would it therefore not be better to banish entirely the name *Serpula triquetra* of Linnæus ?

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* The figure of Seba (i t 29 fig 1, 2) does not agree, as already observed by Cuvier, with the diagnosis, it wants the disque of Cuvier or the thorax, "égalant au moins la moitié de l'abdomen"

4 *S vermicularis*, L ? *testa* tereti, flexuosa, læviuscula, apice libero protensa, rosea, ore patulo, carina denticulata dorsali demum obsoleta. Diam 2⅓'''

*Animal* branchiis omnino coccineis, filorum multorum, operculo coccineo, crenis plurimis (Fig A Plate III )

This species shows with how little judgement the *Serpulæ* have been investigated Blainville, 'Dict' *l c* p 553, assigns to each branchia *seven to eight* digitations, while in the drawing we find on each side twenty-six! In the description he terms the operculum clavate with two minute horns, but this is the case, according to pl 1 fig 3, with the operculum of *Vermilia triquetra*, and the figure of *Serpula vermicularis*, pl 1 fig 1, exhibits a totally different form of operculum, being according to the definition I have given above, that of a true *Serpula* Is it possible to commit greater contradictions? Thus then, according to Blainville's *description* of the operculum, the animal is not a *Serpula* but must be a *Vermilia*, Lamarck, which genus Blainville adopts. Cuvier likewise states in the 'Regne Animal,' ed 2 iii p 191, (according to Mull Z D,) that the operculum has two or three small points, in which his species and Muller's would be a *Pomatoceros*

[It is possible that nos 1, 2 and 4 should be considered as mere varieties of one species ]

5 *S aspera*, Ph, *testa* teretiuscula costis circa 7, crenulatis ornata, alba Diam 1'''

*Animal* branchiis fuscescentibus aut rubentibus, filorum 8 utrinque, operculo albido, crenis 16—24 (Fig B )

An *Vermilia scabra*, Lam ? The figure in Delessert's 'Recueil,' &c is thoroughly bad, and the text in this work is, as is well known, of no assistance whatever

6 *S subquadrangula*, Ph, *testa* elongata, subquadrangula, angulis crenato-dentatis, carinis tribus, singulis in medio laterum liberorum Diam ¾'''

*Animal* albidum, branchiis filorum 8 utrinque, operculo basi aucto, fuscescente, crenis admodum profundis, circa 24 (Fig C )

The fleshy petiole is not simply conically thickened at the extremity, but first cylindrically and then obconically

7 *S venusta*, Ph, *testa* tereti, transversim striata, varicibus pluribus ornata, alba, ore patulo Diam 3'''

*Animal* coccineum, branchiis filorum frequentium, operculi crenis circa 60

The largest species which I have observed and preserved in spirits The animal is 28''' in length, and 3''' in thickness

## 2. PLACOSTEGUS, *Ph*

1 *Pl crystallinus*, Scac, *testa* vitrea, triquetra, demum libera, et

carinis omnibus excurrentibus tricuspidata, carina dorsali serrata Diam $1\frac{1}{4}'''$

*Animal* album, fasciis duabus fuscis in branchiis, filis circa 9 in utraque, pedunculo operculi simplici (Fig D)

*Serpula crystallina,* Scac Catalogo, p 18

Lives in great depths upon corals

2 *Pl fimbriatus,* Delle Chiaje, *testa* teretiuscula, seriebus 4—7 longitudinalibus appendicum falcatarum, pectinatarum, confertissimarum ornata Diam $1—1\frac{1}{2}'''$

*Animal* album, branchiarum coccinearum filis utrinque circa 9, pedunculo operculi appendice aucto (Fig E)

*Serpula* fimbriata, D Ch Memorie, iii p 226 t 48 f 19, 20, testa (animal cl auctori non innotuit)

### 3 VERMILIA, *Lamk*

1 *V triquetra,* Lamk, *testa* triquetra, flexuosa, alba, altero latere adnata Diam $1'''$

*Animal* branchiarum albarum, fusco-articulatarum filis numerosis? (saltem ultra 7), operculo elongato, subcylindrico, obtuso, pedunculo utrinque filum gerente (Fig F)

*Vermilia triquetra,* Lamk nr 2 "Son opercule est conique"

Rare See the previous observation respecting Linnæus's *Serpula triquetra*

2 *V infundibulum,* Gm, *testa* tereti, alba, multoties varicosa, quas ex infundibulis sese recipientibus conflata, ore quam maxime patulo Diam (oris) $4\frac{1}{2}''''$

*Animal* branchiarum albo coccineoque fasciatarum filis multis, operculo elongato-conico (Fig G)

*Serpula infundibulum,* Gm p 3745; Lamk nr 9 excl var, Delessert, Recueil, 1 fig 8 ad specimen malum

3 *V clavigera,* Ph, *testa* tereti, lineis longitudinalibus elevatis quinque ornata Diam $\frac{3}{4}''''$

*Animal* operculo valde elongato, subcylindrico (Fig H)

The dry animal did not exhibit the branchiæ distinctly on being softened

4 *V calyptrata,* Ph, *testa* tereti, crassa, transversim corrugata. Diam $1\frac{1}{2}'''$

*Animal* fuscescens, collari lineaque in filis branchiarum viridibus, filis branchiarum 11, ciliis rufo-fuscis, operculo conum obliquum truncatum referente (Fig J)

5 *V multicristata,* Ph, *testa* tereti, lamellis 5, longitudinalibus, plerumque pectinatim incisis cristata Diam $\frac{3}{4}''''$

*Animal* albidum, operculo parvo, conico, basi carnosæ, multo crassiori, subglobosæ insidente (Fig K)

I likewise possessed only a dried specimen of this species, the branchiæ of which could not be disentangled

6 *V elongata,* Ph, *testa* obscure quandrangula, crassa, transversim rugosa, linea impressa dorsali Diam. $\frac{3}{4}''''$

*Animal* rubrum, branchiarum utrinque filis 6—8, operculo elongato conico, pedunculo utrinque filum gerente [ut in *V triquetra*] (Fig L)

7 *V quinquelineata*, Ph, *testa* tereti, lineis elevatis, longitudinalibus, lævibus, quinque ornata [ut in *V clavigera*] Diam $\frac{1}{2}$''''—$\frac{2}{3}$''''

*Animal* branchiarum lutescentium filis utrinque 8, rubro maculatis, operculo conum brevem obliquum referente [fere ut in *S calyptrata*] (Fig M)

8 *V polytrema*, Ph, *testa* triquetra adnata, carinis foris frequentibus perforatis Diam $1\frac{1}{2}$''''

*Animal* coccineum, branchiarum filis utrinque c 6, operculo forma coni obliqui brevissimi, pedunculo albido annulis tribus fuscis ornato et utrinque filum gerente [ut in nr 1 et 6] (Fig N)

In *Vermilia triquetra* and other triangular *Serpulæ*, the keels consist when broken through of a series of cells; in this species only the septa as it were of the cells are developed, and the three keels perforated by the rows of their apertures are highly elegant in appearance The diameter of the tubes is very small, from the lateral adherent margins occupying the greater portion of the diameter

9 *V emarginata*, Ph, *testa* tereti, alba, carinis 3—4 sæpe in dentes antrorsum directos, dorso incisos elevatis Diam 1''''

*Animal* filis branchiarum utrinque 6—7, operculo formam coni obliqui truncati referente, pagina superiore marginata, antice emarginata, obscure bidentata (Fig O)

I examined a softened specimen of the animal in Cassel

## 4 POMATOCEROS, *Ph*

1 *P tricuspis*, Ph, *testa* triquetra, sæpe in gyrum contorta, alba Diam 2''''

*Animal* branchiis albo et coccineo, sive albo et fusco fasciatis, filis ultra 18, operculo hemisphærico, vertice cornubus tribus acutis instructo, pedunculo utrinque filum gerente (Fig P)

Very common This appears to be the *Serpula triquetra*, Fr Hoffmann, 'Verhandl Berl Gesells' vol iii p 150 It may probably likewise be *S triquetroides* (!), Delle Chiaje, Mem iv t 67 f 15 without description. Does *S vermicularis*, Cuv, 'Regne Anim' ed 2 iii p 191, likewise belong here? "son opercule en massue est armée de deux ou trois petites pointes"

*Vermilia triquetra*, 'Dict des Sc Nat' pl 1 fig 3, appears to form a second species, the operculum of which, supposing the figure to be correct, consists of two appendages and supports a forked appendage, the two ends of the fork being obtuse

## 5 CYMOSPIRA, *Savigny*

No species belonging to this genus occurs, as far as I am aware, in the Mediterranean

### 6 EUPOMATUS, *Ph*

1 *E uncinatus*, Ph, *testa* tereti, transversim rugosa Diam 1''''
*Animal* fuscescens, branchiarum albarum, fusco-fasciatarum filis utrinque 13, margine operculi inciso-dentato, cornubus octo, apice incurvo uncinatis (Fig Q)

Not rare Delle Chiaje, 'Memorie,' vol iii t 48 fig 21, figures a perfectly similar animal *with two opercula*, but calls it *Sabella euplæana*, and asserts that its shell consists of grains of sand!!

2 *E pectinatus*, Ph, *testa* tereti, transversim rugosa, lineisque longitudinalibus obsoletis Diam $\frac{3}{4}$''''
*Animal* fulvum, branchiarum filis utrinque decem, punctis coccineis ornatis, operculi margine crenato, cornubus duodecim, rectis, utrinque pectinatis, dentibus tribus acutis (Fig R)

A specimen which I examined possessed *two* perfectly similar opercula

### 7 SPIRORBIS, *Lamk*

1 *Sp Cornu Arietis*, Ph, *testa* spirali, tereti, concentrice striata, anfractu ultimo reliquos abscondente Diam totus gyri 4''''
*Animal* pallide aurantiacum, branchiarum albarum filis utrinque *quatuor*, operculo obliquo, subspathulato, in parte postica appendice brevi aucto (Fig S)

The operculum is placed obliquely on the petiole as in *Cymospira*, the inferior or hinder margin is thicker, and supports a short, weak, bifid appendage, the upper or anterior margin is thin and simple *Spirorbis nautiloides*, Lamk, is extremely common, I have not however had occasion to examine the animal

### 8 FILOGRANA, *Berkeley*

I have not been able to observe the animal of this section According to the short notice, without any statement respecting the source, in Lam 'Hist' &c ed 2 v p 621, "le nombre des appendices tentaculaires est de *huit*, dont deux garnis d'un opercule infundibuliforme" Are there really *eight* tentacular appendages instead of two? That would be highly remarkable Or are the other six *appendices tentaculaires* the branchiæ?

### 9 PROTULA, *Risso* (*ex emendatione Cuvieri*)

1 *Pr intestinum*, Lamk, *testa* magna, tereti, undato-torta, lævi, primum repente, deinde libera, Diam 5''''
*Animal* (secundum Cuvier) branchiis aurantiacis

Rare I have never been able to obtain the animal The synonyma are *Serpula intestinum*, Lamk, no 3, Delessert, Recueil, t 1 fig 7 bene —*Protula Rudolphii*, Risso, Hist Eur Mérid iv p 406 [Risso's description is so different from Cuvier's statements, that notwithstanding the authority of Cuvier, and notwithstanding the great mistakes which so frequently occur in Risso's descriptions, we are inclined to doubt the identity ]—*Sabella Protula*, Cuv Règne Anim, ed 2 iii p 192

### 10 PSYGMOBRANCHUS, *Ph*

1 *Ps protensus*, Gm, *testa* tereti, lævi, protensa, elongata, parum versus finem attenuata Diam $2\frac{1}{4}''''$

*Animal* flavescens, branchiarum filis utrinque ultra 40, albis rubro annulatis, membrana laterali lutea, maculis septem rubris

*Serpula protensa*, Gm p 3744, Rumph t 41 f 3, Martini, 1 fig 12 A

Although Rumphius's figure represents a species from Amboina, I cannot detect in the figure any difference between it and my species

2 *Ps cinereus*, Forsk, *testa* filiformi, *glabra*, varie flexa Diam $\frac{1}{5}$—$\frac{1}{4}''''$

*Animal* pallide aurantiacum, branchiarum coccinearum filis utrinque *quatuor*

*Serpula cinerea*, Forsk fn arab p 128, Gm p 3747

3 *Ps intricatus*, L, *testa* filiformi, flexuosa, tereti, *scabra*, medio subcarinata, valde rugosa Diam $\frac{1}{5}$—$\frac{1}{4}''''$

*Animal* aurantiacum, branchiarum albarum filis utrinque tribus

*Serpula intricata*, L, ed 12 p 1265, Gm p 3741 Very common

I am in doubt about the following species, having only seen a single specimen

*Apomatus ampulliferus*, Ph, *testa* transverse rugata, dorso sulcis duobus longitudinalibus, approximatis bipartito Diam $\frac{1}{2}''''$

*Animal* operculo nullo, branchiis flavidis, filis utrinque 7, punctis purpureis ornatis, *filo uno in vesiculam sphæricam* terminato

I should have looked upon this curious formation without hesitation as a monstrosity, if my friend Scacchi had not observed, a few years previously, the animal likewise with the vesicle

*Observation* —In the work 'Actinien, Echinodermen und Wurmer des Adriatischen und Mittelmeeres,' by Dr Grube, there is represented in fig 11 the bristle of *Serpula latisetosa* This name does not occur at all in the text p 90, but there is a *Sabella latisetosa*, and in my copy, pages 57 to 64 are wanting According to the catalogue, p 90, the author collected the following species —

*Serpula intricata*, L

——— *glomerata*, L The Linnæan species is, according to the authorities quoted, *Vermetus triquetra*, Born

——— *plicaria*, Lam

——— *infundibulum*, Gm

——— *vermicularis*, L.

*Serpula proboscidea*, Gm Founded on two figures of Martini which I do not venture to explain

——— *protensa*, Gm

——— *echinata*, Gm

——— *contortuplicata*, L

——— *decussata*, Gm Founded on Lister, t 547 f 4 (copied in Martini, 2 f 17 ) from Barbadoes, and is probably a *Vermetus* I suspect that Dr Grube has conceived under this name *Vermetus subcancellatus*, Born

*Spirorbis nautiloides*, Lam

## EXPLANATION OF PLATE III

*Fig* A The operculum of *Serpula vermicularis*, L
*Fig* B ——— *aspera*, Ph
*Fig* C ——— *subquadrangula*, Ph
*Fig* D The operculum of *Placostegus crystallinus* Sc
*Fig* E ——— *fimbriatus*, D Ch
*Fig* F The operculum of *Vermilia triquetra*, Lam
*Fig* G ——— *infundibulum*, Gm
*Fig* H ——— *clavigera*, Ph
*Fig* J ——— *calyptrata*, Ph
*Fig* K ——— *multicristata*, Ph
*Fig* L ——— *elongata*, Ph
*Fig* M ——— *quinquelineata*, Ph
*Fig* N ——— *polytrema*, Ph
*Fig* O ——— *emarginata*, Ph
*Fig* P The operculum of *Pomatoceros tricuspis*, Ph
*Fig* Q ——— *Eupomatus uncinatus*, Ph
*Fig* R ——— *pectinatus*, Ph
*Fig* S The operculum of *Spirorbis Cornu Arietis*, Ph
*Fig* T The operculum of *Vermilia triquetra*, Blainv , according to the 'Dict d Sci Nat' planches From the description, it would be the operculum of *Serpula vermicularis*

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## XIX —*Catalogue of Irish Entozoa, with observations* By O'Bryen Bellingham, M D , Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c

[Continued from vol xiii p 430 ]

### Genus 13 PENTASTOMA

(Derived from πέντε, *quinque*, and στόμα, *os* )

*Gen Char* —Body flattened or slightly cylindrical Mouth situated between two pores upon each side, each pore having a hook-like process projecting from it The five orifices placed in a lunate manner upon the head

THE genus *Pentastoma* is named so from the presence of five pores upon the head, the central one being regarded as the mouth Rudolphi separated it from the genus *Polystoma* with which it had been previously united, he likewise removed it from the order *Cestoidea* to *Trematoda*, to which it properly belongs

The species are not numerous; they inhabit the frontal sinus, the lungs or peritonæal cavity, and never occur in the alimentary canal Hitherto species of this genus have been found only in a few mammalia and reptiles, they have never been detected in either birds or fish

*Pentastoma tænioides* * Frontal sinus of dog (*Canis familiaris*)

## Order 4 CESTOIDEA

(Derived from *κεστος, cingulum*, and *εἶδος, forma* )

The order *Cestoidea* is characterized as follows Body elongated, flattened, soft, continuous or articulated Head very seldom provided with simple lips, but in almost all cases furnished with two or four *bothrii*, depressions or suckers all the individuals hermaphrodite

The Entozoa included in the order *Cestoidea* do not form a very natural family, the head differs so much in the several genera, in some being flattened, pyramidal or tetragonal, with two or four opposite depressions, while in others it is truncate, hemispherical or globular, and provided with a proboscis which is often armed with a circle of hook-like processes The neck is as frequently absent as present The body is elongated, flat, soft, continuous or articulated, with marginal or central pores The species occur in mammalia, birds, reptiles and fish They inhabit almost exclusively the alimentary canal

### Genus 14 Scolex

(Derived from *σκώληξ, vermis* )

*Gen Char* —Body flattened, soft and continuous, without any trace of articulation, enlarging into a head anteriorly, posteriorly attenuated Head tetragonal, provided with four ear-shaped depressions

This genus was established by Muller, and has been adopted

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* The *Pentastoma tænioides* was named so from its resemblance to the *Tænia* it is not a common species, I possess but a single specimen

It measures upwards of 2½ inches in length, and half an inch in breadth at its widest part Colour whitish, of a dirty yellow brown along the median line Body flattened, anteriorly broad, and diminishing gradually to the posterior extremity, marked with numerous transverse elevated lines, resembling the joints of the *Tænia* when contracted, margin crenate, dorsal surface prominent along the median line Pores five in number, small, and placed in the form of a half moon upon the abdominal surface of the anterior extremity The two lateral pores upon each side of the mouth of an ovate shape, with a little, sharp, hook-like process projecting from each by all zoologists since It contains but a single species, and is confined almost exclusively to fish, never occurring in either mammalia, birds or reptiles, the alimentary canal is the usual habitat, rarely the abdominal cavity

M Leuchart looks upon the *Scolex* as the young of the *Anthocephalus*, but without reason De Blainville, amongst other characters, describes two red spots as seen at the posterior part of the head of the animal, I have only observed this in the *Scolex* from the sole (*Solea vulgaris*) Rudolphi in his first work, 'Entozoorum Historia Naturalis,' distinguished six species of *Scolex* (four of which were doubtful), but in his last work, 'Synopsis Entozoorum,' he admits but one species, the *Scolex polymorphus*

| | |
|---|---|
| *Scolex polymorphus* | Intestines of turbot (*Pleuronectes maximus*)<br>Intestines and pyloric appendages of holibut (*Hippoglossus vulgaris*)<br>Intestines of sole (*Solea vulgaris*)<br>Stomach and intestines of dab (*Platessa Limanda*)<br>Pyloric appendages of ling (*Lota Molva*)<br>Intestines of conger-eel (*Anguilla Conger*)<br>Intestines of lump-sucker (*Cyclopterus Lumpus*) |

### Genus 15 TETRARHYNCHUS

(Derived from τετρας, *quatuor*, and ρύγχος, *proboscis* )

*Gen Char* —Body flat, continuous, without articulations, terminating posteriorly in a simple or forked extremity Head provided with two lateral bipartite depressions (appearing at times to constitute four), and with four short retractile tentacula armed with recurved hooks

This genus was established by Bosc under the name *Hepatoxylon*, subsequently Rudolphi changed it to *Tetrarhynchus* It is not numerous in species, twelve only being enumerated by Rudolphi The species are almost confined to fish, one occurred in the turtle, but they have never been found in either mammalia or birds They seldom inhabit the alimentary canal

| | | |
|---|---|---|
| 1 | *Tetrarhynchus grossus* * | Abdominal cavity of salmon (*Salmo Solar*) |
| 2 | ———— *solidus* † (Drummond) | Abdominal cavity of salmon (*Salmo Salar*) |

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* The *Tetrarhynchus grossus* I have inserted on Dr Drummond's authority, as I have not met with it He has given a figure and description of this species in the second vol of the new series of the 'Magazine of Nat History,' p 571.

† The *Tetrarhynchus solidus* was discovered and named by my friend

### Genus 16 LIGULA

(Derived from *ligula*, a *strap* )

*Gen Char* —In the first degree of its development Body very long, flat, continuous, without articulations, having a central longitudinal depression, without any appearance of head or of organs of generation

In the perfect state Body very long, flat, continuous, without articulations Head provided with a simple depression upon each side, ovaries in a single or double series, with the lemnisci in the median line

The genus *Ligula* was established by Bloch and Goetze, and has been adopted by zoologists since The species are not numerous, seven only being enumerated by Rudolphi They occur in birds and fish (principally the fresh-water species), one species has been found in the seal (*Phoca vitulina*) They inhabit the abdominal cavity of fish, and the alimentary canal of birds

The opinion put forward by Rudolphi of the mode of development of the *Ligula* is curious, viz that it begins life in fish, and arrives at its perfect state of development in birds which feed upon these fish He founds his conclusion upon the fact, that the *Ligula* occurs only in the peritonæal cavity of fish and in the intestinal canal of birds, in addition, he has never, in the *Ligula* of fish, found the ovaries developed as they are in birds, and in Austria, where the fish which commonly contain *Ligula* do not occur, he never could discover the *Ligula* in the aquatic birds However, Bremser does not coincide with Rudolphi upon this point, and De Blainville asks very naturally, what is the use of the ova being developed in the ovaries of the *Ligula* of birds? and how do these find their way into the abdominal cavity of fish?

The *Ligula* appears to be the only species of Entozoon ever used as food by man I have learned from my friend Dr Scouler, that in some parts of Italy where the *Ligula* is particularly abundant in the fish, this species affords a favourite food to the people

| | |
|---|---|
| *Ligula sparsa* | Small intestines of crested grebe (*Podiceps cristatus*) |

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Dr. Drummond of Belfast, who was kind enough to communicate specimens to me, recently I found a single specimen of this species in the abdominal cavity of the salmon (*Salmo Salar*), it lay loosely attached to the peritonæal coat of the intestines by the proboscides of the head I can bear testimony to the accuracy of the description given of it by Dr Drummond, which is contained in the same vol of the 'Mag of Nat Hist' as that last noticed, and is illustrated by several figures I shall only add, that in the recent animal a number of bodies like ova were seen, with the assistance of a lens, upon each side of the depressions on the head, lying apparently under the integuments.

## XX.—*On the Fructification of* Polysiphonia parasitica, *Grev.* By the Rev. DAVID LANDSBOROUGH*

[With a Plate.]

WERE I to be asked by a friend to point out the richest field on our Ayrshire coast for a botanical ramble, I would without hesitation point to Portincross in the parish of West Kilbride. It is however a place of so much beauty and interest, that I would advise my friend to spend an hour at least in enjoying the scene before he enters on his botanical researches.

The name of the place carries us back to olden times. It was called Portincross, it is said, from being the harbour from which it was usual to sail, when the body of any of the kings of Scotland was to be carried to Iona, where the remains of so many of our Scottish monarchs were deposited. The ancient castle on the rocky shore carries us back also to a remote age; for though it is of more recent date than the period when Iona was a place of note for learning and religion and royal sepulture, yet it is so antique that we have no sure history of its erection. An ancient cannon, seen at the castle, brings us within the range of historical *memorabilia*, for it was brought up from the deep after the wreck of one of the vessels of the Spanish Armada, when Providence so evidently interposed in behalf of our land. The name of the proprietor of the castle and of the adjoining lands awakens pleasing recollections. *Crawford of Auchenames* sounds well in the ears of every lover of Scottish song, as an ancestor of the present proprietor wrote some of those sweet pastorals which have been rendered still more precious by being married for several generations to some of the sweetest of our Scottish airs.

I shall not attempt to describe the scenery, for that would require a gifted pen to do it any justice. Let our botanist feast his eyes for a little, and then let him enter on his pleasant work. Is he in search of Phænogamous plants? In rambling along the sunny 'banks and braes,' he will not be long in filling his vasculum. Is he a muscologist? There, some half-score years ago, along with Mr George Gardner, now in Ceylon, and well known in the botanical world, I for the first time met with *Hookeria lucens* and *Neckera crispa*, which though not the rarest are among the most beautiful of our mosses. *There*, are *muscosi fontes*, and shaded rocks, and veteran stone-dykes, and decaying stumps of trees, favourite habitats of the mossy tribes. And when he has perambulated the sunny *braes*, and explored every pendent cliff and crevice of the rocks, and robbed of its golden garniture every stone and stump, let him as a happy algologist turn to the sea, and he will there find a rich and inexhaustible field before him *There*, are many Algæ to be found in a live state on the rocks and in the pools of the rocks, but he will find that the little creek or harbour acts as a decoy to wile within his reach many of the precious floating wanderers of the deep, and that by every tide it is replenished with fresh variety, amidst which he may luxuriate and pick and choose at will

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* Read to the Botanical Section of the Glasgow Philosophical Society, 25th June, 1844, by William Gourlie, Jun.

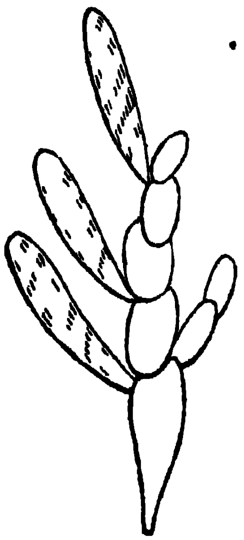
I do not mean at present to luxuriate on Algæ, nor even to attempt to enumerate the various species that, in their season, may be there found I shall limit my few remarks to one which, though considered rare, is met with during summer in considerable abundance amongst the rejectamenta in the little creek I mean the beautiful little *Polysiphonia parasitica* I have fixed on *it*, because I have observed on it a kind of fructification which I think has hitherto been unnoticed I am quite aware that I am on dangerous ground, that a person with few scientific books, and scarcely any leisure to read those he has, in proclaiming discoveries, is in very great danger of treading on a touchy toe, or of stealing some person's thunder Now, if this should be my unfortunate case, I can only respectfully say, "Pardonnez-moi, I really did not intend it" However, I am at all events entitled to say that the fruit of *Polysiphonia parasitica* is rare, when so distinguished a botanist as Mr Harvey says he has never seen the capsules A few days ago my youngsters, who have more leisure than I have, brought me specimens from Portincross with three kinds of fructification! Two kinds they had detected with the naked eye, but the third, and as I think *new* kind, I detected on using a lens The fine large dark-coloured capsules (Pl IV fig 1) were very conspicuous, being large in proportion to the size of the plant On a distinct plant from that which bore the capsules, the second kind of fructification was very visible, viz large reddish brown granules imbedded not only in the ultimate ramuli, giving them a knotted as well as spotted appearance, but also imbedded in single longitudinal rows in several of the branches (fig 2 *a*) The kind which I detected on the same plant which had the granular fructification consisted of capsules also, but of quite a different form from the large dark brown capsules, and resembling the capsules of *Rhodomela subfusca*, or of *R lycopodioides*, or rather something intermediate between these two (fig 2 *b*) They seem nearly of the same colour and substance as the branches on which they are placed, whereas the other capsules are different from the branches both in colour and texture It is this sameness of substance and colour with the branches which makes them less easily detected, for they are of sufficient size to be seen on close examination even with the naked eye I might have been led to conjecture that they were only the common capsules in an immature state, had they not been on the plants that bore granular fruit, and had I not found it stated in Harvey's 'Manual,' that the two kinds of fructification, capsules and granules, are on distinct plants It is fair to state however that I have observed two granules, and only two, in one of the ramuli of a plant with the large dark-coloured capsules, so that it may turn out that where the granules abound the capsules are dwarfed, and that where there are scarcely any granules in the branches and ramuli, there the capsules swell and are perfected

I must now conclude my lengthy note I am glad of anything that attracts attention to this beautiful little *Polysiphonia*

Rockvale, Saltcoats, June 1844

## XXI —*Note on the Fructification of* Cutleria By G Dickie, M D, Lecturer on Botany in the University and King's College of Aberdeen*

The results of observations which have already been communicated to the Society on the fructification of the Algæ found in this vicinity, led to an examination of other genera not growing here, but of which I possess dried specimens, and at present reference is specially made to *Cutleria multifida,* Grev. In Harvey's 'Manual,' Dr Greville's account of the fructification is quoted, viz "minute tufts of capsules scattered on both sides of the frond; the capsules pedicellate, containing several distinct granules" I



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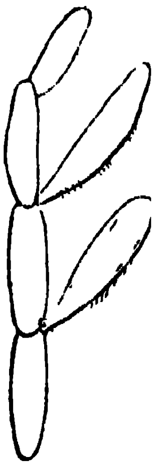

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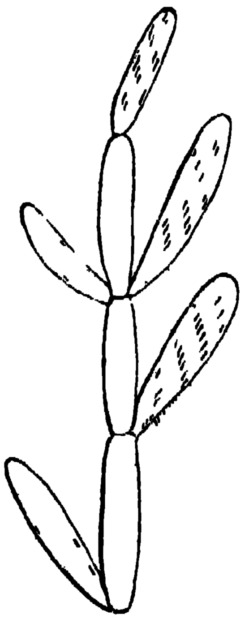

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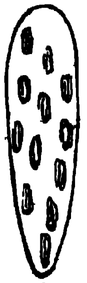

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* Read before the Botanical Society of Edinburgh, April 11th, 1844

have in vain searched for such a structure as is represented in the 'Algæ Britannicæ', from a careful examination it appears that the fructification of this species is essentially the same as that which has been called acrospermal It was remarked in a former communication that *Asperococcus* presents the basisperms and their accompanying simple filaments completely exposed, so of *Cutleria* it may be probably legitimate to say, that its fructification represents the acrospermal arrangement of a Fucus also placed on the surface, without any inflexion of the frond to form conceptacles The accompanying figures represent the structure of the fruit in the genus alluded to In this genus the asci and sporidia are exceedingly delicate and transparent figs 1, 2, 3 represent both, fig 4, one of the latter separated

## XXII —*On Microscopic Life in the Ocean at the South Pole, and at considerable depths* By Prof Ehrenberg*

The following is the substance of a paper laid by Prof Ehrenberg, May 23rd, 1844, before the Berlin Academy, and containing some of the results derived from his recent investigations upon materials furnished from the South Polar expedition of Captain Ross and the voyages of Messrs Darwin and Schayer, their object being to determine the relation of minute organic life in the ocean, and at the greatest depths hitherto accessible

Last year the author submitted to the Academy a survey of the geographical distribution of such organisms over the entire crust of the earth, but the field of these inquiries being one of such vast extent and importance, it became evident to him, that to arrive at any positive general results, it was necessary to examine the subject under a more special point of view, and under this conviction, two different courses of investigation suggested themselves as best adapted to fulfill that purpose, viz first, to ascertain both the constant and periodical proportion which minute organisms bear to the surface of the ocean in different latitudes, and secondly, to examine submarine soil or sea-bottom raised from the greatest possible depths It is an easy matter, generally, to collect materials of this kind, but before applying to them the test of philosophic criticism and research, the author feels that it is essentially requisite to retrace the contributions of other writers upon the same subject, premising, however, that their value will always be enhanced in so far as the materials collected have been obtained with due care and reference to their several localities

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* From the Proceedings of the Berlin Academy for May, and communicated by the Author

## I. *The South Polar Voyage from* 1841 *to* 1843.

Very essential progress was made in our knowledge of the minute and invisible forms of organic life during the years devoted to this expedition by Captain Ross In the year 1840, the Royal Society of London appointed a committee to prepare a series of physical and meteorological questions to be solved by the proposed expedition, and it was at the express desire of the author that Alex v Humboldt undertook to suggest to that body the importance of attention being paid to the study of the relations under which minute organisms exist, as one likely to throw considerable light upon the principal questions now agitated, involved in the recent history of the earth's crust, and also to recommend that the directions given by the author as to the methods of collecting them should be adopted throughout the whole voyage Through the scientific ardour of Dr J Hooker, son of the well-known botanist and a voyager on board the ship Erebus, a variety of valuable materials were collected during the expedition, and a short time back about forty packages and three glasses of water were transmitted to Germany from the neighbourhood of Cape Horn and Victoria Land About the same time also, Mr Darwin, the profound observer upon the formation of coral reefs in the South-seas, contributed objects from other localities

The author set about examining carefully without delay, as such an opportunity might not again recur, water which had been taken from the South Polar sea of from 75° to 78° 10′ south latitude, and 162° west longitude, with a view of determining its relative amount of minute organic life Of the dry materials some packets only have as yet been examined, those namely which from their localities appear to possess the greatest interest, and among these were specimens of the remains of melted polar ice and sea-bottom, taken under south latitudes 63° and 78°, from depths of 190 to 270 fathoms (*i e.* 1140—1620 feet), the greatest depths that have been hitherto sounded

The relations of minute organic life were found, as the author had anticipated, to be the same at the south as at the north pole, and generally of great extent and intensity at the greatest depths of the ocean

Previous observations upon those loftiest mountains whose pinnacles are capped with eternal ice, had determined that a gradual progressive disappearance of organic life takes place from the base to their summit, and that too in accordance with particular laws, to the tree succeeding the lowly shrub, next grass and lichens, till finally we arrive at the regions of perpetual snow, where there is a complete absence of all life In like manner the development of organized beings has been conceived to diminish from the equator to the arctic regions of the earth, the latter becoming first destitute of trees, then of grass, lastly of lichens and algæ, until at the poles ice and death hold solemn reign

The greatest depths in the ocean at which Mollusca had been found to exist were, according to the observations of Mr Cuming in the year 1834, the genera *Venus*, *Cytherea* and *Venericardia* at 50, *Byssoarca* at 75, and *Terebratula* in 90 fathom water According to Milne-Edwards and Elie de Beaumont, 244 metres, or 732 foot, formed the extreme range for the growth of corals and the development of organic matter in the sea off the coast of Barbary From a 100-fathom depth, Péron drew up in the year 1800, off New Holland, *Sertulariæ* and a variety of corallines, which were all luminous, and on an average three degrees higher in temperature than the surface of the sea In 1824 and 1825 Quoy and Gaimard, in their valuable researches upon the structure of corals, asserted that branched corallines could occur only in a depth of from 40 to 50 fathom, and that in a 100-fathom of water *Retepora* alone existed According to Ellis and Mylius, who wrote in 1753, the greatest known depth from which a living animal had been taken was the *Umbellaria Encrinus*, which was fished up by Captain Adrian in Greenland from 236 fathom of water, equal to a depth of 1416 foot Specimens, however, of the sea-bottom have been drawn up from still greater depths, for at Gibraltar, Captain Smith found in 950 fathom, or 5700 foot of water, sand containing fragments of shells, and Captain Vidal, according to Mr Lyell, detected in the mud of Galway Firth, from a depth of 240 fathom, only some *Dentalia*, the remainder of the sea-bottom from the same depth consisting of pulverized shells and other organic remains devoid of life

According to the calculations of Parrot, a column of sea-water at a depth of 1500 foot exercises a pressure of 750 pound, or 7½ hundredweight, upon the square inch, and since the atmospheric air inclosed in these animals of a delicate cellular structure descending from the surface of the ocean would produce alternately such extremes of expansion and contraction as to appear destructive to such organisms, just doubts have been raised whether organic life could actually subsist at great depths

Wollaston, moreover, in 1840 proved that at the great depth of 670 fathom, in the Mediterranean Sea off Gibraltar, the proportion of salt in the water was four times greater than at the surface Very accurate and scientific investigations upon the amount of salts of the sea had been already published by Lenz in Petersburg during 1830, and Mr Lyell, in his 'Geology' of 1840, was induced to regard the observations of Wollaston not as simply indicating a local phænomenon, but to conclude that at still greater depths the relative proportion of saline matter would be still more remarkable, and must progress in a similar advancing ratio

Lastly, Elie de Beaumont, in 1841, adopted the opinion, that the limits to which the waters of the sea had been found by Siau capable of being set in motion, must be also those at which sessile marine animals could exist, since these have to wait for their food, which in this way only could be conveyed to them, and that consequently the limits of stationary organic life, taken in conjunction with the depth of the waves, could not much exceed 200 metres or 600 feet

Such considerations, deeply affecting the general science of geology, and to which must be added observations upon the increase of temperature towards the centre of the earth, have ever suggested as an interesting matter for inquiry to the author, to examine minute organic life in relation to the depth of the element in which it could exist

Science indeed owes a great debt of gratitude to those travellers who have so industriously provided the materials of this investigation, in respect of which materials it may be observed generally, that they are very rich in quite new typical forms, particularly in genera, of which some contain several species, these, occasionally with some mud and fragments of small crustaceans, form the chief part of the mass The new genera* and species are here recorded, and of these the *Asteromphali* are very remarkable, from their particularly beautiful stellate forms

## *Analysis of the various materials furnished by Dr Hooker from the South Polar Voyage*

1 Residue from some melted Pancake Ice† at the barrier in 78° 10′ S lat, 162° W long

### A SILICEOUS POLYGASTRICA

1 *Actinoptychus biternarius*
2 ASTEROMPHALUS *Hookerii*
3 — *Rossii*
4 — *Buchii*
5 — *Beaumontii*
6 — *Humboldtii*
7 — *Cuvierii*
8 *Coscinodiscus actinocyclus*
9 — *Apollinis*
10 — *cingulatus*
11 — eccentricus
12 — *gemmifer*
13 — limbatus
14 — lineatus
15 *Coscinodiscus Lunæ*
16 — Oculus Iridis
17 — radiolatus
18 — subtilis
19 — velatus
20 *Dicladia antennata*
21 — *bulbosa*
22 *Dictyocha* aculeata
23 — Binoculus
24 — *biternaria*
25 — Epiodon
26 — *octonaria*
27 — Ornamentum
28 — septenaria

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* Of the 7 new genera of Polygastrica, viz *Anaulus*, *Asteromphalus*, *Chætoceros*, *Halionyx*, *Hemiaulus*, *Hemizoster*, and *Triaulacias*, short characters are given in the Proceedings of the Academy also of the 71 new species.

† Thin and level fragments of ice found floating in the ocean

29 *Dictyocha* Speculum
30 *Flustrella* concentrica
31 *Fragilaria* acuta
32 — Amphiceros
33 *Gallionella pileata*
34 — sulcata?
35 Halionyx *senarius*
36 — *duodenarius*
37 Hemiaulus *antarcticus*
38 Hemizoster *tubulosus*
39 *Lithobotrys denticulata*
40 *Lithocampe australis*
41 *Pyxidicula dentata*
42 — hellenica
43 *Rhizosolenia Calyptra*
44 — *Ornithoglossa*
45 *Symbolophora Microtrias*
46 — *Tetras*
47 — *Pentas*
48 — *Hexas*
49 *Synedra* Ulna?
50 *Triceratium Pileolus*
51 *Zygoceros australis*

### B SILICEOUS PHYTOLITHARIA

52 *Amphidiscus* Agaricus
53 — clavatus
54 — *Helvella*
55 *Lithasteriscus bulbosus*
56 *Spongolithis* acicularis
57 — aspera
58 — *brachiata*
59 — Caput serpentis
60 — cenocephala
61 — Clavus
62 — collaris
63 — Fustis
64 *Spongolithis Heteroconus*
65 — inflexa
66 — *Leptostauron*
67 — mesogongyla
68 — neptunia
69 — *radiata*
70 — trachelotyla
71 — *Trachystauron*
72 — *Trianchora*
73 — *vaginata*
74 — verticillata
75 — uncinata

### C CALCAREOUS POLYTHALAMIA

76 *Grammostomum divergens*
77 *Rotalia antarctica*
78 *Rotalia Erebi*
79 *Spiroloculina* —?

In several forms of the genus *Coscinodiscus* their green ovaries were recognizable, consequently they must have been alive

2 Residue from melted ice, while the ship sailed through a broad tract of brown pancake ice, in 74° to 78° south latitude (Materials from 75° S lat, 170° W long)

### A SILICEOUS POLYGASTRICA

1 Asteromphalus *Buchii*
2 — *Rossii*
3 *Coscinodiscus* lineatus
4 — *Lunæ*
5 — Oculus Iridis
6 — radiolatus
7 — subtilis
8 *Dictyocha* aculeata
9 *Eunotia* gibberula
10 *Fragilaria* acuta
11 — *pinnulata*
12 — rotundata
13 Hemiaulus *antarcticus*
14 Hemizoster *tubulosus*

### B SILICEOUS PHYTOLITHARIA

15 *Spongolithis Fustis?* Fragm

These and the former specimens were sent over in bottles of water They were the same sealed bottles in which they were collected in the year 1842 In the first little bottle, in which the sediment was considerable, almost every atom being a distinct siliceous organism, *Hemiaulus antarcticus* predominated. The larger bottle of the second mass had allowed the greater part to leak through the sealed cork, so that only about a quarter remained. The mass of sediment arrived in Berlin in May 1844, almost all in such a condition, that the author had no hesitation in considering them still alive, although they all belonged to the almost or perfectly motionless forms. The Fragilarias predominated (*F. pinnulata*), these, though rarely adherent in chains, had their green ovaries mostly preserved in a distinct natural disposition. *Coscinodisci* and *Hemiaulus* also often exhibited groups of green granules in their interior. No movement.

The following numbers were sent over dried:—

3. Sea-bottom drawn up by the lead from 190 fathom depth, in 78° 10′ S. lat., 162° W. long.

### A. SILICEOUS POLYGASTRICA

1 ASTEROMPHALUS *Hookerii*
2 — *Buchii*
3 — *Humboldtii*
4 — *Cuvierii*
5 *Coscinodiscus Apollinis*
6 — *gemmifer*
7 — limbatus
8 — lineatus
9 — *Lunæ*
10 — radiolatus
11 *Dictyocha septenaria*
12 — Speculum
13 *Fragilaria* Amphiceros
14 *Fragilaria* al. sp.
15 *Gallionella Sol*
16 HEMIAULUS *antarcticus*
17 *Lithobotrys denticulata*
18 *Mesocena Spongolithis*
19 *Pyxidicula*
20 *Rhizosolenia Ornithoglossa*
21 *Symbolophora? Microtrias*
22 — *Tetras*
23 — *Pentas*
24 — *Hexas*
25 TRIAULACIAS *triquetra*
26 *Triceratium Pileolus*

### B. SILICEOUS PHYTOLITHARIA

27 *Amphidiscus Polydiscus*
28 *Spongolithis* acicularis
29 — aspera
30 — *brachiata*
31 — Caput serpentis
32 — cenocephala
33 — *Clavus*
34 *Spongolithis* Fustis
35 neptunia
36 *Pes Mantidis*
37 *Trianchora*
38 *vaginata*
39 uncinata

4. From snow and ice taken from the sea in 76° S. lat., 165° W. long., near Victoria Land.

### SILICEOUS POLYGASTRICA

1 *Coscinodiscus* lineatus
2 *Lunæ*
3 subtilis
4 *Fragilaria pinnulata*
5 rotundata
6 al. sp.

The chief mass was densely crowded with *Fragilaria pinnulata* and with *Coscinodiscus*, which on softening in water generally exhibited their green ovaries, perhaps originally brown.

### 5 Contents of the stomach of a Salpa, 66° S lat, 157° W long. 1842

#### SILICEOUS POLYGASTRICA

1 *Actiniscus Lancearius*
2 *Coscinodiscus Apollinis*
3 — *cingulatus*
4 — *gemmifer*,
5 — lineatus
6 — *Lunæ*
7 — subtilis
8 *Dictyocha* aculeata
9 — Speculum
10 *Fragilaria* acuta
11 — *granulata*
12 — rotundata
13 Halionyx *duodenarius*
14 *Pyxidicula*

This material contained a large number of *Dictyochas*, which evidently must have been particularly sought for by the Salpa, since they do not occur in the other samples, and consequently appear to be a favourite food of the Salpa

### 6 Flakes floating on the surface of the ocean in 64° S lat, 160° W long

They are like the *Oscillatoriæ* of our waters, matted with delicate fibres and with granules interspersed through the mass The chief substance is formed of siliceous, very delicate, lateral tubes of the quite new and peculiar genus *Chætoceros* The nature of the granules remains doubtful The other forms are scattered through this matted substance, all exhibit however their dried-up ovaries, and consequently were collected alive

#### SILICEOUS POLYGASTRICA

1 Asteromphalus *Darwinii*
2 — *Hookerii*
3 — *Rossii*
4 — *Buchii*
5 — *Humboldtii*
6 Chætoceros *Dichæta*
7 — *Tetrachæta*
8 *Coscinodiscus* lineatus
9 — subtilis
10 *Dictyocha* aculeata
11 — Binoculus
12 — Ornamentum
13 — Speculum
14 *Fragilaria* Amphiceros
15 — *granulata*
16 Hemiaulus *obtusus*
17 *Lithobotrys denticulata*

### 7 The mass brought up by the lead from the bottom of the sea in the Gulf of Erebus and Terror, at the depth of 207 fathoms, in 63° 40′ S lat, 55° W long

The following species, occasionally with distinct green ovaries, were found in this very small sample, mixed among the apparently unorganic sand

#### A SILICEOUS POLYGASTRICA

1 Anaulus *scalaris*
2 *Biddulphia ursina*
3 *Coscinodiscus Apollinis*
4 — *cingulatus*
5 *Coscinodiscus Lunæ*
6 — subtilis
7 — velatus
8 *Fragilaria* rotundata

9 *Gallionella Sol*
10 — *Tympanum*
11 *Grammatophora* parallela
12 HEMIAULUS *antarcticus*
13 *Rhaphoneis fasciolata*
14 *Zygoceros? australis*

#### B SILICEOUS PHYTOLITHARIA

15 *Spongolithis* acicularis
16 *Spongolithis* Fustis

### 8 Sea-bottom drawn up by the lead from 270 fathom, in 63° 40′ S lat, 55° W long

#### A SILICEOUS POLYGASTRICA

*Achnanthes* turgens
*Amphora* libyca
ANAULUS *scalaris*
*Biddulphia ursina*
*Campylodiscus* Clypeus
*Coscinodiscus Apollinis*
— *gemmifer*
8 — lineatus
9 — *Lunæ*
10 — Oculus Iridis
11 — radiolatus
12 — subtilis
13 *Denticella lævis*
14 *Discoplea Rota*
15 — *Rotula*
16 *Flustrella* concentrica
17 *Fragilaria* Amphiceros
18 — *pinnulata*
19 *Gallionella Oculus*
20 — *Sol*
21 *Gallionella* sulcata
22 *Grammatophora* africana
23 — parallela
24 — *serpentina*
25 HEMIAULUS *antarcticus*
26 *Lithocampe* n sp
27 *Mesocena Spongolithis*
28 *Navicula elliptica*
29 *Podosphenia* cuneata
30 *Pyxidicula* hellenica?
31 *Rhaphoneis fasciolata*
32 *Rhizosolenia Calyptra*
33 — *Ornithoglossa*
34 *Stauroptera* aspera
35 *Symbolophora Microtrias*
36 — *Tetras*
37 — *Pentas*
38 — *Hexas*
39 *Synedra* Ulna

#### B SILICEOUS PHYTOLITHARIA

40 *Amphidiscus* clavatus
41 *Spongolithis* acicularis
42 — aspera
43 — *brachiata*
44 — Caput serpentis,
45 — Clavus
46 — Fustis
47 *Spongolithis Heteroconus*
48 — *ingens*
49 — neptunia
50 — obtusa
51 — *vaginata*
52 — uncinata

#### C CALCAREOUS POLYTHALAMIA

53 *Grammostomum divergens*

### 9 Samples from Cockburn's Island, the furthest limit of vegetation at the South Pole, 64° 12′ S lat, 57° W long

Off Cockburn's Island (Cockburn's Head) Dr Hooker saw an Alga, as the lowest and furthest step of vegetation, with forms of *Protococcus* The Alga is one of the *Tetraspora* allied to *Ulva*, which Dr Hooker has reserved in order to describe more accurately I have not recognised the *Protococcus* in its dried condition This mass, however, is chiefly and equally peopled with and made up of Siliceous Polygastrica An apparently unorganic sand, penguins' feathers and excrements, the *Ulva*, and only five as yet distinguished species of siliceous Infusoria in great numbers, form the mass sent over The vegetable substances may indeed have disappeared by putrefaction The excrement of the birds, like guano, might abundantly furnish solid matter, but the solid siliceous earthy element of the little invisible polygastric animals appears to form no inconsiderable part of the solid substance, which by the death of generations goes to form earth and land

The following forms were observed —

SILICEOUS POLYGASTRICA

1 *Eunotia* amphioxys
2 *Pinnularia* borealis
3 — peregrina ?
4 *Rhaphoneis Scutellum*
5 *Stauroptera capitata*

Two forms are new, two have been observed also at the north pole, and one is widely distributed

### II *Oceanic materials from M Schayer*

M Schayer of Berlin, who for fifteen years was superintendent of English sheep-folds at Woolnorth in Van Diemen's Land, has, in answer to a request sent to him in the year 1842 by the author, collected materials unquestionably rich in microscopic animals, he also collected water taken from the ocean in different regions on his return in 1843, and brought with him to Berlin four bottles holding from a quarter to half a pint The author had wished that water had been drawn up at a distance from the coast in accurately known places, in order to become acquainted in some measure with the usual amount of microscopic life of the ocean

The four well-preserved sealed bottles which have arrived in Berlin were shown to the Academy by the author, and the water is still quite clear and transparent, having only a few flakes at the bottom, which render it turbid when shaken, but soon subside again to the bottom, and the former transparency is restored When opened, a slight but yet evident trace of sulphuretted hydrogen was perceptible

The microscopic investigation has given the following results

1 Water from the south of Cape Horn on the high sea under 57° S lat, 70° W long, contained—

SILICEOUS POLYGASTRICA

1 *Fragilaria granulata*
2 HEMIAULUS *obtusus*
3 *Lithostylidium* Serra

2 Water from the region of the Brazilian coast near Rio de Janeiro on the high sea, in 23° S lat, 28° W long

A SILICEOUS POLYGASTRICA

1 *Cocconeis* Scutellum
2 *Fragilaria* Navicula
3 *Gallionella* sulcata
4 *Haliomma* radiatum
5 *Navicula* dirhynchus
6 *Navicula* Scalprum
7 *Pinnularia oceanica*
8 — peregrina
9 *Surirella* sigmoidea
10 *Synedra* Ulna

B SILICEOUS PHYTOLITHARIA

11 *Spongolithis* aspera
12 — cenocephala
13 *Spongolithis* Fustis
14 — *vaginata*

3 Water from the equatorial ocean in the direction of St Louis in Brazil, in 0° lat, 28° W long

A SILICEOUS POLYGASTRICA

1 *Fragilaria* rhabdosoma
2 *Fragilaria* Navicula

B SILICEOUS PHYTOLITHARIA

3 *Lithostylidium* rude
4 *Lithostylidium* Serra

4 Water from the Antilles Ocean, 24° N lat, 40° W long

A SILICEOUS POLYGASTRICA

1 *Haliomma* radiatum

B SILICEOUS PHYTOLITHARIA

2 *Lithodontium* nasutum
3 *Lithostylidium* Amphiodon
4 *Lithostylidium* rude

C MEMBRANOUS PORTIONS OF PLANTS

5 *Pollen* Pini

It follows from these four series of observations obtained through M Schayer, that the ocean, in its usual condition, without peculiarity of colour, without storms and other influences, contains, in the most transparent sea-water, numerous perfect and wholly invisible organisms suspended in it, and that the siliceous-shelled species are the most predominant in all those cases, although the analysis of sea-water does not show silica as a constant ingredient

## III *On a Cloud of Dust which rendered the whole air hazy for a long time on the high Atlantic Ocean in 17° 43′ N lat, 26° W long, and its being constituted of numerous siliceous animalcules*

Mr Darwin, the well-known and most meritorious English traveller and writer on coral reefs, relates in the account of his travels, that a fine dust constantly fell from the hazy atmosphere off the Cape Verd Islands, and also on the high sea of that region, while he was there; and likewise on a ship, which, according to the account in his letter, was 380 sea-miles distant from land The wind was then blowing from the African coast Mr Darwin has sent to the author for examination a sample of the dust which fell on the ship on the high sea at that great distance from land This dust has been universally regarded hitherto as volcanic ashes The microscopic analysis has clearly shown that a considerable portion, perhaps one-sixth of the mass, consists of numerous species of Siliceous Polygastrica and portions of silicated terrestrial plants, as follows —

A SILICEOUS POLYGASTRICA

1 *Campylodiscus* Clypeus
2 *Eunotia* Amphioxys
3 — gibberula
4 *Gallionella* crenata
5 — distans
6 — granulata
7 — marchica
8 — procera
9 *Gomphonema* rotundatum ?
10 *Himantidium* Arcus
11 — Papilio
12 *Navicula* affinis ?
13 — lineolata
14 — Semen
15 *Pinnularia* borealis.
16 — gibba
17 *Surirella* (peruviana ?)
18 *Synedra* Ulna

B SILICEOUS PHYTOLITHARIA

19 *Amphidiscus* Clavus
20 *Lithodontium* Bursa
21 — curvatum
22 — furcatum
23 — nasutum
24 — truncatum
25 *Lithostylidium* Amphiodon
26 — *clavatum*
27 — cornutum
28 — læve
29 *Lithostylidium* Ossiculum
30 — quadratum
31 — rude
32 — Serra
33 — *spiriferum*
34 *Spongolithis* acicularis
35 — aspera
36 — mesogongyla
37 — obtusa

The forms included in this catalogue, mostly known and for the most part European, prove—

1. That this meteoric shower of dust was of terrestrial origin.

2 That it was not volcanic ash

3 That it was dust which had been lifted up to a great height from a dried-up marshy district by an unusually strong current of air or a whirlwind

4 That the dust did not necessarily and evidently come from Africa, as being the nearest land, although the wind blew from thence when the dust fell, for this reason, that no exclusively African forms are among it

5 That as *Himantidium Papilio*, a very marked form, has hitherto occurred only in Cayenne (see the Mikroskopische Leben in Sud- und Nord-Amerika, plate 2 fig 2 ), and as the *Surirella* is also probably an American form, only two conclusions present themselves, either that the dust was raised in South America into

the upper strata of air, and brought by a change of the current in another direction, or *Himantidium Papilio*, together with *Surirella*, likewise occur elsewhere, namely in Africa

### *Review of the Results of these Investigations*

1 Not only is there, as resulted from the former observations of the author (vide d Mikroskopische Leben in Amerika, Spitzbergen, &c ), an invisible minute creation in the neighbourhood of the Pole, where the larger animals can no longer subsist, but a similar creation is highly developed at the South Pole

2 Even the ice and snow of the South Polar Sea is rich in living organisms, contending successfully with the extremity of cold

3 The microscopic living forms of the South Polar Sea contain great riches hitherto wholly unknown, frequently of very elegant shape, since no less than seven peculiar genera have been discovered, of which some contain several, one as many as seven species

4 The forms collected in the year 1842, near Victoria Land, were capable of being examined in an almost fresh state in Berlin in May 1844, which shows how long preservation is possible

5 The ocean is not only populated at certain localities, and in inland seas or on the coasts, with invisible living atoms, but is proportionately thickly crowded with life everywhere in the clearest state of the sea-water and far from the coasts

6 Hitherto but one perfectly microscopic form from the high sea was known, and even that from the neighbourhood of the coast, namely the *Astasia oceanica*, which Von Chamisso had observed, all other accounts were imperfect and useless By the new materials the number of species is increased nearly 100

7 The hitherto observed oceanic microscopic forms are chiefly siliceous-loricated animals with some calcareous-shelled Do these numerous forms derive the material of their shells from the bottom of the sea? This question becomes daily more interesting

8 Siliceous- and calcareous-shelled minute living forms are not only mixed up with the muddy sea-bottom, but they themselves form it They live even to a depth of 270 fathom, and consequently support a pressure of water equal to 50 atmospheres, the whole influence of this does not indeed bear upon their organic tissues when they are locally fixed, but when they move from the bottom upwards or reversely, yet it does not appear to have acted on the drawn up specimens Who can doubt but that organic beings which can support a weight of 50 atmospheres may support 100 and more?

9 The supposition, that in great depths, above 100 fathom,

there is no fresh nutriment for organized beings of any kind, has become untenable

10 Life and temperature in the depths of the ocean are, in their variable relation, the points which at present deserve especial attention

11 The showers of meteoric dust, or supposed ashes, have at present been proved to be, even in the case where they fell 380 sea-miles from land, of organic and terrestrial origin

12 It is not perishable *Protococci* or *Ulvæ* or Lichens that principally constitutes the organic covering and soil of the ultimate islands in the Polar Sea, but the living creatures that form the first layer of solid earth are invisible, minute, free animals of the genera *Pinnularia, Eunotia* and *Stauroneis* with their siliceous loricæ  Several species from the North Pole and the South Pole are identical

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## XXIII —*Descriptions of some British* Chalcidites By Francis Walker, Esq , F L S

Callimome Rasaces, Fem  *Cupreus purpureo varius, metathorace viridi, abdomine cyaneo basi rufo, antennis nigris, pedibus fulvis, alis subfuscis*  (Corp long lin 2, alar lin 3 )

Body convex  head and thorax cupreous, tinged with purple, covered with minute scales disposed in little transverse striæ  head short, transverse, a little broader than the thorax  antennæ subclavate, black, as long as the thorax, first joint fulvous, long, stout, linear, black towards the tip, second cyathiform, third and fourth very minute, fifth and following joints to the club successively decreasing in length, club long-conical, acuminate, much more than twice the length of the eleventh joint  thorax elliptical, punctured sparingly and irregularly  prothorax large, subquadrate, its breadth exceeding its length, rounded on each side in front  scutum of the mesothorax large, its breadth slightly exceeding its length, sutures of the parapsides distinct, approaching each other, axillæ large, triangular, not conniving, scutellum nearly rhomboidal, of moderate size, abruptly decumbent behind  metathorax includ[illegible] the propodeon short, transverse, rugulose, mostly green  podeon extremely short  abdomen elliptical, subcompressed, smooth, dark blue varied with purple, as long as the thorax, metapodeon pale red, occupying rather more than one-fourth of the dorsum, octoon much shorter than the metapodeon, ennaton much longer? than the octoon, decaton as long? as the octoon, protelum, paratelum and telum short  oviduct a little longer than the abdomen  legs stout, fulvous  wings slightly fuscous, nervures piceous, humerus less than half the length of the wing, ulna more than half the length of the humerus, radius about one-fourth of the length of the ulna, cubitus extremely short, not so long as the radius, stigma of moderate size, emitting a short stout branch that points towards the tip of the radius

Callimome Ærope, Mas *Viridis, abdomine æneo, basi cupreo-viridi, antennis fulvo-fuscis, pedibus fulvis, femoribus basi fuscis, tarsis basi flavis, alis limpidis*

*Male* —Body convex head and thorax brilliant green, covered with very minute scales so disposed as partly to form little transverse undulations head a little broader than the thorax antennæ clavate, fuscous above, fulvous beneath, as long as the thorax, first joint long, linear, second long-cyathiform, third and fourth very minute, fifth and following joints to the eleventh successively shorter and broader, club long conical, more than twice the length of the eleventh joint thorax oval prothorax large, slightly narrower in front, its length much more than half its breadth scutum of the mesothorax rather long, sutures of the parapsides very distinct, slightly curved, approaching each other, axillæ large, triangular, not conniving, scutellum rhomboidal metathorax transverse, shining, decumbent podeon extremely short abdomen æneous, nearly linear, smooth, shining, slightly concave along the disc covered excepting the metapodeon with very minute scales, shorter and narrower than the thorax, metapodeon bright green varied with cupreous, occupying more than one-third of the dorsum, octoon short, ennaton a little longer than the octoon decaton longer than the ennaton, protelum as long as the decaton, paratelum and telum very short legs fulvous, stout, coxæ green, thighs slightly fuscous towards the base, knees yellow, tarsi yellow at the base, fuscous at the tips wings limpid, ample, nervures fulvous, humerus much less than half the length of the wing, ulna a little shorter than the humerus, radius hardly so long as one fourth of the ulna, cubitus not more than half the length of the radius, stigma very small, emitting a little branch Length of the body 1½ line, expansion of the wings 2 lines

Found near Windsor, in June

Pteromalus domesticus (Entomological Magazine, ii 481), Mas *Viridis, abdomen cupreum basi viride, antennæ nigræ, pedes nigri, genubus tarsisque albis aut flavis, propedum genubus tarsisque flavis aut fulvis, alis limpidis, nervis pallide fuscis*

Body convex head and thorax minutely squameous head a little broader than the thorax the middle ocellus very little in advance of the other two antennæ filiform, stout, longer than the thorax, first joint long, slender, second cyathiform, third and fourth very minute, fifth and following joints to the tenth linear, successively but very slightly decreasing in length, club fusiform, twice the length of the tenth joint thorax oval prothorax transverse, very short, just visible above, rounded in front scutum of the mesothorax short, slightly convex, its breadth much exceeding its length, sutures of the parapsides approaching each other, very indistinct, axillæ large, triangular, not conniving, scutellum subconical, or nearly pentagonal, the three fore sides being applied to the axillæ and to the margin of the scutum between them, its scales are more minute than those of the scutum metathorax very short, appearing transversely just behind the scutellum propodeon transverse, of moderate size, narrower behind, slightly decumbent, having a little ridge along its disc, and a rim on either side podeon extremely short abdomen flat, concave, smooth shining, nearly linear, narrower and much shorter than the thorax, the segments minutely squameous, metapodeon occupying about one-third of the dorsum, octoon, ennaton, decaton and protelum of moderate and nearly equal size, paratelum short, telum very short legs rather short and stout, the mesotibiæ and metatibiæ have two spines at their tips, the protibiæ only one wings moderate, humerus much less than half the length of the wing, ulna less than half the length of the humerus, radius as long as the ulna, cubitus very long, a little shorter than the radius, slightly curved, stigma very small, emitting a short branch

*Female* —Head as broad as the thorax antennæ subclavate, as long as the thorax, first joint slender very long, second long-cyathiform, third and fourth very minute, fifth and following joints to the thirteenth short, closely joined together, in form like a long spindle which is about equal in length to the four preceding joints, club conical, more than twice the length of the tenth joint abdomen round, concave, sculptured like that of the male, shorter but not narrower than the thorax, metapodeon occupying more than one-third of the dorsum, octoon and following segments to the protelum of moderate size successively but slightly decreasing in length, paratelum and telum very short sternum, coxæ and thighs scaly like the thorax abdomen slightly keeled, dorsal segments passing underneath, not conniving nor contracted, but leaving a space between them where the ventral segments appear these latter are equal in number to those of the dorsum, but unlike them successively increase in length from the base to the tip of the abdomen, along the last there is a channel from the base of which the oviduct emerges but it does not extend beyond the abdomen

In the month of May the leaves of the apricot-trees in my garden were eaten by multitudes of the larvæ of caterpillars of *Lozotænia Xylosteana* The moth appeared in the middle of June, and shortly afterwards some of the pupæ disclosed an abundance of *Pteromalus domesticus* In number the males were to the females in the proportion of two to five In the following year the moth appeared again, but attacked the pear-trees instead of the apricot-trees It was not infested by the *Pteromalus*, but I reared two other insects from the pupæ, one belonging to the *Ichneumonidæ*, the other a species of *Tachina* Like two other species, *Pt muscarum* and *Pt tenuis*, the females are found on windows throughout the year, they sometimes appear in great swarms, and are perhaps parasitic on *Tortrix viridana* as well as on the insect mentioned above

*Tetrastichus Rapo* (Annals of Natural History, vol i ) In the month of August many insects of this species emerged from the cocoons of *Microgaster glomeratus*, Linn , that infests the caterpillars of *Pontia Brassicæ* Thirty-eight specimens or more appeared, and the proportion of males to that of females was as one to four, or thereabouts

Encyrtus Epona, Mas *Piceus, subtus flavus, pedibus fulvis, antennis tarsisque piceis, scutello flavo, alis limpidis* (Corp long lin 2/3, alar lin 1 2/3)

Body rather long and narrow, nearly flat, finely squameous, thinly clothed with short white hairs, piceous above, yellow beneath head transverse, short, as broad as the thorax eyes oval, of moderate size encircled with yellow ocelli near together on the vertex antennæ piceous, filiform, slender, hairy, much longer than the body, first joint fusiform long, slender, yellow beneath, second cyathiform, third and following joints to the ninth long, linear, successively decreasing in length, club fusiform, not longer than the ninth joint thorax elliptical prothorax transverse, narrower in front, larger than is usual in this genus scutum of the mesothorax broad, forming one segment with the parapsides, yellow on either side, axillæ triangular, very large, almost meeting each other on the dorsum, scutellum yellow, obconical metathorax with the propodeon and podeon very short abdomen long-obconical, concave, narrower and a little shorter than the thorax, two or three segments visible on the dorsum legs fulvous long, slender, hairy, tarsi piceous, middle legs dilated, and their tibiæ armed with long spines as usual wings limpid, narrow, nervures piceous, humerus much less than half the length of the wing, ulna about one-fourth of the length of the humerus, radius shorter than the ulna, cubitus shorter than the radius, stigma extremely small

From the collection of the Rev G T Rudd

Encyrtus Euryclea, Fem *Ater, capite cyaneo, antennis piceis flavo cinctis, pedibus flavis nigro cinctis, alis limpidis* (Corp long lin 1/3, alar lin 2/3)

Body black, flat, slightly shining head blue transverse, nearly as broad as the thorax antennæ clavate, a little longer than the thorax, first joint long, piceous, rather stout yellow at the tip, second joint fuscous, cyathiform, third and following joints to the ninth very small, successively increasing in breadth, third, fourth, fifth and sixth fuscous, seventh, eighth and ninth yellow, club piceous, fusiform, as long as all the joints from the third to the ninth thorax oval prothorax transverse, extremely short scutum of the mesothorax broad, longitudinally rugulose, scutellum somewhat obconical metathorax with the propodeon and podeon very short abdomen long-obconical, depressed, narrower but not longer than the thorax oviduct piceous legs pale yellow, stout, a broad black band across each thigh and tibia, fore-tarsi fulvous, middle legs dilated and their tibiæ armed with long spines as usual wings white, nervures yellow, humerus less than half the length of the wing, ulna thick, fulvous, not more than one-fourth of the length of the humerus, radius shorter than the ulna, cubitus as long as the ulna, stigma extremely small

Found by Mr Haliday at Holywood, near Belfast in Ireland

Encyrtus Pyttalus, Fem *Ater, pedibus piceis, antennis tarsisque fulvis, alis fuscis* (Corp long lin 1/2, alar lin 3/4)

Body black, convex, short, thick, broad, punctured head transverse, short, very large, roughly punctured, broader than the thorax, front convex eyes oval, of moderate size ocelli near together on the vertex antennæ fulvous, slender, clavate, longer than the thorax, first joint long and slender second cyathiform, third and following joints to the ninth small, nearly equal in size, club fusiform, much broader than the ninth joint and more than thrice its length thorax hardly longer than broad prothorax transverse, short, visible above scutum of the mesothorax very short forming one segment with the parapsides, axillæ small, not extending over the dorsum, epimera? large scutellum obconical metathorax with the propodeon and podeon very short abdomen depressed smooth, shining, shorter than the thorax its breadth equal to its length oviduct fuscous legs piceous, stout, tarsi fulvous, middle legs dilated, and their tibiæ armed with long spines as usual wings fuscous, small, nervures piceous, humerus less than half the length of the wing, ulna very short, not one fourth of the length of the humerus, radius as long as the ulna, cubitus longer than the radius, stigma extremely small

*Encyrtus Machæras* Reared by Mr Haliday from the coccus of the elm

*Encyrtus argentifer* *Encyrtus Paralia* is a variety of this species

Aphelinus Acætes Fem *Fulvus, antennis piceis, pedibus flavis, alis limpidis* (Corp long lin $\frac{1}{3}$, alar lin $\frac{2}{3}$)

Body fulvous, flat, slender, shining, finely punctured, yellow beneath head transverse, nearly as broad as the thorax, slightly produced in front eyes oval, rather large ocelli near together on the vertex, the middle one very little in advance of the other two antennæ subclavate, piceous, longer than the thorax, first joint fulvous, long, rather stout, second yellow, long-cyathiform, third and following joints to the eighth short, successively increasing in breadth, club fusiform, broader than the eighth joint and more than twice its length thorax oval prothorax transverse, extremely short, not visible above scutum of the mesothorax rather large, forming one segment with the parapsides, axillæ triangular, not joining together, scutellum somewhat rhomboidal, shorter than the scutum metathorax with the propodeon and podeon very short abdomen long-obconic, longer but not narrower than the thorax legs yellow, tips of the tibiæ armed with a single spine, joints of the tarsi from the first to the fourth decreasing in length, fifth joint longer than the fourth, ungues and pulvilli small wings limpid, nervures yellow not extending beyond the middle of the wing, humerus passing like the ulna along the costa, radius extremely short, cubitus longer than the radius, stigma very small

From the collection of the Rev G T Rudd

## XXIV —*Description of a new British species of* Callithamnion By W H Harvey, Esq, Trinity College, Dublin

[With a Plate]

In the year 1840 I received from the Rev J H Pollexfen a *Callithamnion* gathered by him in the Orkney Islands so distinctly characterized, that I had little difficulty in ascertaining it to be new, and, as a just tribute to its excellent discoverer, I named it *C Pollexfenii* The MSS of my 'Manual of British Algæ' had at that time left my hands, but I forwarded a description of the new *Callithamnion* for insertion in its proper place By some mischance the slip was mislaid and the book published without any notice having been taken of it, but under the MS name of *C Pollexfenii* this beautiful plant has since been known to my friends Mrs Griffiths, Mr Ralfs and others, and I only delayed describing it till I should have an opportunity of revising the whole of the British *Callithamnia*, a labour which has become necessary from the many *varieties* of acknowledged species which have come to my knowledge since the publication of the 'Manual,' and some of which may perhaps be admitted eventually to the rank of species

Having lately, however, received a specimen from Dr Dickie of Aberdeen, which exactly agrees with Mr Pollexfen's, I no longer delay giving a description of it, as follows —

*Callithamnion Pollexfenii*, Harv Slender, flaccid, *alternately* much branched, branches linear, articulate each joint having *two* opposite, subulate, slender, short, spine like, simple ramuli.

On rocks in the sea Orkney Islands, *Rev J H Pollexfen*, 1840, Aberdeen, *Dr Dickie*, 1844, April

Filaments 1—2 inches high, tufted, very slender and flaccid, repeatedly branched in an alternate manner, the major divisions of the frond having a conical or spiry outline Main stem undivided, one-tubed, jointed and transparent, having several alternate, erecto-patent, rather distant branches, which are again twice, thrice or four times branched in a similar manner, each succeeding series of branches being shorter than the preceding Every articulation, both of the stem, the branches and the lesser divisions, emits, at a short distance below the joint or diaphragm, a pair of erecto-patent, simple, subulate, short ramuli of much less diameter than the joint from which they spring. Articulations of the branches 4—8 times, of the ramuli once and a half, or twice as long as broad Colour a fine rosy red Substance very tender Fruit unknown It closely adheres to paper in drying

At first sight no species appears more isolated, and yet a slight inspection will show that it is closely related to *C cruciatum*, next to which it may naturally be placed It differs in being much more branched, in its spiry habit and delicate substance, and, more definitely, in having the opposite ramuli very much shorter and invariably simple and subulate In the other British species with *opposite* simple ramuli (*C Turneri*, *Pluma* and *barbatum*) the ramuli do not issue from *every* joint of the frond, nor do they spring from a point *below* that of the diaphragm These characters are peculiar to *C Plumula* (a species so different from that under consideration that I need not compare it), to *C cruciatum* and *C Pollexfenii* And in another remarkable peculiarity these latter species also agree, namely, that the ramification proceeds on a plan different from that of the *ramulification* In most Algæ with decompound fronds, the normal division of the branches is likewise that of the ramuli In these it is the reverse, the branches being invariably alternate or scattered, and the ramuli as invariably opposite Here too we never find the ramuli lengthening into branches, and they are nearly of the same size on every part of the frond. And so constantly are they produced by every articulation, that even when a branch is given off, the ramuli of the joint from whose *apex* it springs are as fully developed as those of any simple joint The ramuli in these species have therefore more affinity with true leaves than with young branches W H H

July 16, 1844

## EXPLANATION OF PLATE V

*Fig* 5 *Cal Pollexfenii*, nat size
*Fig* 6 Portion of a branch, magnified
*Fig* 7 Joints of the stem, to show the insertion of the ramuli, magnified

## XXV —*On the British* Desmidieæ By JOHN RALFS, Esq, M R C S, Penzance*

[With a Plate ]

### EUASTRUM, *Ehr.*

Frond simple, compressed, deeply divided into two segments which are emarginate at their ends, lobed or sinuated and generally pyramidal

The fronds are simple, longer than broad, often oblong, compressed, and so deeply constricted that their segments seem only united by a narrow chord The generally pyramidal segments are broadest at their bases, and are there in such close apposition for their entire breadth as nearly to conceal the notch on each side until the endochrome has collapsed They are attenuated towards the ends, which in the adult state are always more or less

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* Read before the Botanical Society of Edinburgh, April 11, 1844

emarginate, and their sides are more or less lobed or sinuated The surface is irregular with inflated prominences, which also form tubercle-like projections along the margins, their number and situation are probably constant in the adult fronds of the same species and different in distinct species A transverse view, when the two segments are separated, is the best method of ascertaining their number, the terminal lobe has similar prominences

The species of *Euastrum* are not well defined, plants of this genus vary greatly in form, and it is not unlikely that young fronds have been described as distinct* Whenever it is practicable the frond should be examined in four different directions, namely, in the front or usual position, at the side, at the end, and by a transverse or junction view after the segments have separated

In this genus Ehrenberg includes *Micrasterias,* Ag (not *Micrasterias,* Ehr ) and *Cosmarium*, Meneghini separates the former from it, but includes it in the latter genus *Euastrum* appears to me to be distinct from both, and especially from *Cosmarium* It agrees with *Micrasterias* in having lobes and emarginate ends, but the fronds are not incised, nor do the lobes radiate from the centre From *Cosmarium* it differs in the lobed and emarginate segments, and also in the inflated projections on the surface These characters will also distinguish it from the other genera in this family

Starch granules have been detected in nearly all the following species by Mr Jenner and myself

I have divided this genus into three sections *In the first section* the fronds are comparatively large, and appear to the naked eye like roundish or oblong dots The segments are distinctly lobed, the terminal lobe, cuneate and itself emarginate, is partly included in a notch between the projections of the lateral lobes, and the sinuses which separate it from them are deep and directed inwards and downwards

*In the second section* the fronds are more minute and scarcely visible to the naked eye, the segments are less decidedly lobed, but the margin is crenate or sinuated, the terminal portion unites with the basal by a neck-like contraction of the segment, and is therefore never included within a notch, the corners are rounded

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* I have, since I wrote the above, found my opinion confirmed by the following remarks of Meneghini —" Lobi quoque, pro ætate summopere variant, ideoque in characteribus fixandis, formis perfecte evolutis attendendum Ex hoc factum est quod species nonnullæ ab auctoribus olim distinctæ nunc temporis evanuere, nec suspicatio excludi potest circa alias quoque species formas summopere similes sistentes "—Meneghini, 'Synopsis Desmidiearum' in Linnæa 1840, p 218

The outline of one of the segments has some resemblance to that of a decanter

*In the third section* the fronds are extremely minute, the segments are generally still less lobed than in the last, and the form of the front view is more irregular and differs from that of the preceding sections, especially in having an acute angle or process at either the corners or sides of the terminal portion

* *Segments of the frond deeply lobed, the terminal lobe cuneate, and partly included in a notch formed by the projection of the ends of the lateral lobes*

1 *E verrucosum*, Ehr Frond rough with conic granules, the segments three-lobed, lobes broad, subcuneate, with a broad shallow notch Ehr Infus p 162 tab 12 fig 5, Pritch Infus p 196 fig 125 *Cosmarium verrucosum*, Menegh Synop Desmid in Linnæa 1840, p 222

Amongst aquatic plants in pools rare Cheshunt, *Mr Hassall*, Weston Bog near Southampton Rusthall Common, Kent, near Tunbridge Wells, and Ashdown Forest, Sussex, *Mr Jenner*, Penzance

Fronds compressed, the segments which slightly diverge from each other are broader than long, deeply three-lobed, the lobes, particularly the terminal one, broad and cuneate, and each has a broad, shallow, terminal notch Surface of the frond furnished with numerous conic granules which give the margins a dentated appearance each segment has two prominences near the base, on these the granules form two or three concentric circles with a granule in the centre, the terminal lobe has two similar but smaller prominences

The side view, which is not so broad as the front one, is inflated at the base and attenuated upwards into a short neck, and emarginate and slightly dilated at the end The terminal lobe, as seen by an end view, is four-lobed

This is a very beautiful species, and once seen, is not liable to be confounded with any other British species, but may be easily known by the conic granules covering the frond and giving a dentate appearance to the outline

PLATE VI fig 3 *Euastrum verrucosum* *a*, front view, *b*, side view, *c*, end view of terminal lobe

2 *E oblongum* Frond smooth, oblong, segments five-lobed, lobes broad, subcuneate, emarginate, the terminal one partly included in a notch *Euastrum Pecten*, Ehr Infus p 162 tab 12 fig 4, Pritch Infus p 196 *Echinella oblonga*, Grev in Hook Br Fl vol ii p 398 (1830) *Cosmarium oblongum*, Menegh *l c* p 221 *Eutomia oblonga*, Harv Br Alg p 188

In boggy pools Warbleton, Sussex, and near Tunbridge Wells, Weston Bog near Southampton, *Mr Jenner*, Penzance, Dolgelley and Carnarvon

Fronds large, appearing to the naked eye like small dots, oblong, three or four times longer than broad, each segment divided into five lobes in a pinnatifid manner The lateral lobes are broad, cuneate, with a broad shallow notch The terminal lobe is cuneate and its notch closed, the corners of all the lobes are rounded

The surface of the empty frond is minutely punctate

Plate VI fig 4 *Euastrum oblongum* *a*, front view, *b*, side view, *c*, empty frond

3 *E Pelta* Fronds smooth, subquadrilateral, three-lobed, terminal lobe partly included in a notch formed by the ends of the lateral lobes *Cosmarium Pelta*, Corda, Alm de Carlsb p 121, Menegh *l c* p 222

In fresh-water pools Weston Bog near Southampton, Ashdown Forest, Sussex, and Fisher's Castle, Kent, *Mr Jenner*, Dolgelley, Penzance

Fronds large, visible to the naked eye, about three times longer than broad, of a quadrilateral form with rounded ends, terminal lobe cuneate, partly included between the ends of the lateral lobes, rounded and emarginate, the notch closed, the segments of the frond are very broad, three-lobed, or rather each segment has a subquadrate base and a terminal lobe The basal portion is not attenuated, and each lateral margin has a broad shallow notch or sinus, in which there is sometimes a slight intermediate rounded projection

The colouring matter is dark green with large scattered granules, but the margin of the frond is generally colourless

The surface of the empty frond is minutely punctate

Plate VII fig 1 *Euastrum Pelta* *a*, front view, *b*, side view, *c*, empty frond

** *Terminal lobes exserted and connected to the basal portion by a neck-like contraction of the segment, the corners of the lobes rounded*

4 *E didelta* Segments inflated at the base and constricted upwards, the end scarcely dilated, the base is entire or slightly emarginate *Heterocarpella didelta*, Turp Mem p 295 (1828) *Heterocarpella polymorpha*, Ktz Synop Diatom in Linnæa 1833, p 70 fig 82 (some figures only and those not good) *Euastrum ansatum*, Ehr Infus p 162 tab 12 fig 6, Pritch Infus p 196 *Cosmarium didelta*, Menegh *l c* p 219

In fresh-water pools, probably common near Southampton Not uncommon in Sussex, *Mr Jenner*, Henfield, *Mr Borrer*, Cheshunt, *Mr Hassall*, Barmouth, *Rev T Salwey* Carnarvon, Dolgelley, near Carmarthen, and Penzance

Fronds about three times as long as broad, scarcely visible to the naked eye, the segments have some resemblance to a decanter, especially when dilated at the end The entire frond may also be compared to the figure of the bones in the knee-joint

Each segment is inflated at the base and attenuated upwards, in general the end is slightly dilated, and the notch is rather deep but not gaping In some specimens the sides are entire, in others they are slightly emarginate The end view is elliptic and entire with the exception of the transverse notch A transverse view is longer than broad with rounded and entire ends, and the sides slightly inflated in the middle The opening which marks the place where the segments are connected is small and circular

The empty frond is punctated

Plate VII fig 2 *Euastrum didelta* *a*, front view, *b*, side view, *c*, transverse view, *d*, end view, *e*, end view of terminal lobe, *f*, empty frond

5 *E affine* Segments emarginate at the sides near the base, the end dilated, emarginate, rounded at the corners, and the neck with a rounded projection on each side

In peat-pools near Dolgelley

Fronds about as large as those of *Euastrum didelta*, the segments somewhat resemble a decanter in form, the base is broad and inflated and contracted upwards into a wide neck, the dilated end may be compared to a thick rim of a decanter, and on each side of the neck is a small projection or tubercle, the terminal notch is deep but not gaping The body of the segment is broadly emarginate at each side, all the lobes or projections are rounded, and the sinuses shallow

This form approaches to *Euastrum didelta*, of which it may perhaps eventually prove merely a variety, but as I have gathered both forms unmixed with each other, and the present plant, besides the above characters, has protuberances on the front surface, I venture to keep them separate Although I have not seen it, I suspect that a transverse view may afford additional marks of distinction

Plate VII fig 3 *Euastrum affine* *a*, mature plant, *b*, young frond

6 *E gemmatum* Segments emarginate at the sides near the base, suddenly contracted into a very short neck, terminal lobe much dilated, obscurely emarginate *Cosmarium gemmatum*, Breb, Menegh *l c* p 221

*β* Terminal lobe emarginate at each side

In peat-pools near Dolgelley, Penzance, *J R*, Weston Bog near Southampton, *Mr Jenner*

*β* Dolgelley

Fronds rather smaller than those of *E didelta*, nearly three times as long as broad, each segment consists of a broad basal portion, which is somewhat quadrilateral and emarginate at each side, and suddenly contracted to form the very short neck, the terminal lobe has each side elongated and rounded, entire in *a* and slightly emarginate in *β*, the terminal notch is very obscure A transverse view is twice as long as broad, with two rounded projections at each end and three on each side, and a small central opening at the original junction-point of the segments In the specimens I gathered the terminal notch was but slightly marked, partly perhaps on account of their immaturity, since in all the species it is obscure in the young frond, I doubt however whether it is ever so remarkable in this as in the other species*

This plant agrees in its decanter-like form with the two preceding species, but I cannot suppose it to be a variety of either, for in this genus the projecting parts are much less developed in the young than in the adult plant, and nevertheless they were more evident in my immature specimens than in either of the other species

Whilst engaged in examining this species, I was first struck with the advantage to be derived from the figure of the transverse view in the discrimination of nearly allied species I have since obtained Meneghini's Synopsis of this family, and find that he has extensively availed himself of it in forming his specific characters of this genus

Plate VII fig 4 *Euastrum gemmatum* *a*, front view, *b*, side view, *c*, transverse view, *d*, end view, *e*, end view of terminal lobe, *f*, var *β*

*** *Segments with the end acute at the corners, or with acute lateral processes*

7 *E rostratum* Basal lobes of the segments broad and emarginate, terminal lobe with a curved, acute, spine-like process on each side

In fresh-water pools near Dolgelley

Frond very minute, about twice as long as broad, segments obscurely three lobed, or rather with a broad base which is emarginate at each side, and then contracted into a broad short neck connecting it with the terminal lobe The terminal portion has on each side a curved subacute tubercle or process, somewhat like a beak, the end of the lobe is prominent, generally angular, with a deep rounded terminal notch

This species, like the last, is contracted, but less decidedly, into a broad, very short neck, and has emarginate sides, but differs from it in its much smaller size, and especially in having acute projections at the sides of the terminal portion As in these respects it approaches the two following, it seems to connect them with the preceding species

Plate VII fig 5 *Euastrum rostratum*

8 *E spinosum* Fronds oblong, segments obscurely lobed, with a spine-like process on each side near the extremity, the end protuberant and rounded

In fresh-water pools Cheshunt, *Mr Hassall*, Barmouth, *Rev T*

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* I have since examined mature specimens and found the terminal notch always obsolete

*Salwey*, Mayfield and elsewhere in Sussex, near Southampton, *Mr Jenner*, Dolgelley, Penzance

Fronds very minute, about twice as long as broad, segments scarcely lobed, the base slightly emarginate at each side, not contracted into a neck, but with an acute, short, spine-like process on each side near the end, the end itself is produced beyond these spines and rounded, the notch is rather deep and slightly gaping Sometimes the base has one or two spine-like projections on each side

This species differs from *Euastrum rostratum* in not being contracted into a neck, and in its prominent pouting extremity, which is not at all angular beyond the lateral spines

Plate VII fig 6 *Euastrum spinosum* *a*, front view, *b*, end view, *c*, fronds dividing

9 *E binale* Segments concave or truncate at the end, not projecting beyond the acute angles *Heterocarpella binalis*, Turp, Kutz *l c* p 70 *Cosmarium binale*, Menegh *l c* p 221

*a* Segments inflated at the base, the notch broad, forming a concavity between the angles

*β truncatum* Fronds quadrilateral, the end truncate, acute at the angles, with a small triangular notch in the middle

In fresh-water pools Mayfield and Piltdown Common, Sussex, *Mr Jenner*, Dolgelley, Penzance

Fronds very minute, about twice as long as broad, segments inflated at the base, either entire or somewhat bicrenate at the sides, slightly contracted upwards and rather dilated at the end, the terminal notch forms a concavity between the two acute angles

The variety *β*, which may prove distinct, differs in being quadrilateral, and still more in having truncate ends with a small but distinct notch in the centre, the angles are acute, and slightly project laterally, the sides of the segments are generally a little crenate

This species is easily distinguished from the two preceding ones by its concave or truncate ends and its notch, the sides of which do not project beyond the lateral spines or angles.

Plate VII fig 7 *a*, *Euastrum binale*, *b*, var *β*

*Analysis*

| | | |
|---|---|---|
| 1 | Terminal lobes distinct, cuneate, partly included in a notch formed by the lateral lobes | 2 |
| | Terminal lobe not included in a notch | 4 |
| 2 | Frond rough with large conic granules, which give a dentated appearance to the outline | *verrucosum* |
| | Frond minutely punctate | 3 |
| 3 | Segments distinctly 5-lobed, all the lobes emarginate | *oblongum* |
| | Segments 3-lobed .. .... . . | *Pelta.* |

| | | |
|---|---|---|
| 4 | Terminal lobe connected with the base by a neck-like contraction of the segment, the corners all rounded . . | 5 |
| | Terminal lobe often indistinctly separated from the base of the segment, with an acute angle or process on each side | 7 |
| 5 | Segments but slightly dilated at the end | *didelta* |
| | Segments much dilated at the end . . . . | 6 |
| 6 | Terminal notch strongly marked, the neck of the segment with a tubercle on each side | *affine* |
| | Terminal notch obscure, no tubercle on the neck of the segment | *gemmatum* |
| 7 | End concave or truncate, the acute angles as high as the sides of the notch | *binale* |
| | End rounded or angular, projecting beyond the spine-like processes . | 8 |
| 8 | Terminal lobe dilated laterally, and connected with the segment by a neck-like contraction | *rostratum* |
| | End protuberant, no neck like contraction of the segments . . | *spinosum* |

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## XXVI.—CAROLI LINNÆI *Exercitatio Botanico-Physica de Nuptiis et Sexu Plantarum*. Edidit et Latine vertit M. JOHANNES ARV. AFZELIUS.

### PREFATORY NOTICE BY M. AFZELIUS.

IT is stated by Linnæus, in his Autobiography*, that after he had become acquainted with the short treatise of Vaillant on the Sexes of Plants from the 'Acta Lipsiensia,' he began to contemplate a more diligent investigation into the nature of the stamina and pistilla of flowers, that after long and diligent research he came to the conclusion that these constitute the principal parts of the flower, and a new prospect broke upon his youthful mind of thence establishing a Method in Botanical arrangement. About the end of the same year, 1729, George Wallin, at that time librarian at Upsal, published a philologico-critical Dissertation entitled 'De Nuptiis Arborum,' which appearing to Linnæus but little to the purpose, and not having leisure for a public disputation, he drew up in a few pages, "more botanico," as he expresses it, a view of the right notion to be entertained concerning the Sexes of Plants, and communicated them to his earliest patron in the Academy, Ol. Celsius, Doctor in Divinity. Afterwards they fell into the hands of Ol. Rudbeck, jun., at that period professor of medicine and botany at Upsal, who was so much pleased with this early specimen of his genius, that in the following year (1730), having received an honourable exemption from the labours of his office on account of his advanced age, he procured the nomination of Linnæus as his substitute, and thus—a circumstance almost without parallel—the duties of a lecturer on botany were com-

* Published at Upsal, 1823, 4to, p. 15.

mitted to an academical student of scarce three years' standing. This first essay of Linnæus on the Sexes of Plants was afterwards overlooked; it does not appear among his published works, and perhaps was judged by himself as of minor value, after the development of his Sexual System had yielded a more fruitful subject for his immortal works. However this may have been, assuredly the first essays of so great a genius were not to be lost to posterity. By good fortune it happened that a manuscript copy of the 'Prælectiones Anatomicæ,' delivered at Upsal in the year 1731, although in a somewhat mutilated condition, was discovered in the shop of a tradesman of this city *, at the end of which is subjoined, written in the same hand, 'Exercitatio Botanico-Physica de Nuptiis et Sexu Plantarum, &c. authore Carolo Linnæo, Medicin. et Botan. Studioso.' The tract does not appear to me to be in the hand-writing of Linnæus, but rather to be a transcript from the autograph in an antique hand, and somewhat resembling that of Linnæus. With the exception of the title-page and syllabus it is written in Swedish, and comprised in 22 pages. From the conjoined testimony of time, title and context, we feel no hesitation in concluding that this is the very work of which we have been speaking. We have therefore been the more anxious to publish this juvenile essay of Linnæus, since, after a diligent search, it appears that it has been hitherto unpublished, and is further worthy of attention from the consideration that it is the earliest in date (in the 23rd year of his age), and that it contains the earliest of his writings relative to the Sexual System.

A Latin translation is here appended to the Swedish text†, that it may be understood by foreigners. The style of Linnæus is well known, being distinguished by a primæval simplicity and a certain native vigour. In this little work the style certainly is characterized in some places by florid exuberance, and the great interpreter of nature pursues his subject with a kind of sacred ardour. In the translation I have chiefly aimed at fidelity; how far I have succeeded, the kind reader must determine.

### *Exercitatio Botanico-Physica de Nuptiis et Sexu Plantarum in qua recentiorum Botanicorum Placita et Observationes recensentur, authore* CAROLO LINNÆO, Medicin. et Botan. Studios.

### SYLLABUS

§ 1. Introductio.
2. Veterum divisio sexus in plantis.
3. Vita vegetabilis probatur.
4. Requisita utriusque sexus.

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* By the learned J. Liden, Licentiate in Medicine, to whose kindness I am indebted for it.

[† We have given only the Latin version of M. Afzelius.—ED. ANN. N. H.]

§ 5 Vaillant huic sese præ aliis studio addixit
6 Quod in flore quærenda sit sexus distinctio
7 Ex collatione florum sexus apparet
8 Partes floris quæ ?
9 Calyx ad generationem nihil confert
10 Neque petala.
11 Sed stamina et pistillum
12 Flores cum fructu juncti
13 Flores a fructu separati in eadem planta
14 Flores a fructu separati in diversa planta
15 Explicatio partium floris, exinde dependens distinctio sexus secundum Vaillantium
16 Nuptiæ plantar quid ?
17 Analogia hermaphroditar in regno animali et vegetabili
18 Morlandi sententia de fecundatione rejicitur
19 Modus fecundationis ignotus, sed quod fiat probatur
20 α a curvatura styli in quibusdam
21 β a detrimentis quæ pluviæ adferunt
22 γ a staminum positura ad pistillum
23 δ a fecundatione ante progerminationem foliorum
24 ε a marcescentia staminum post fecundationem
25 ζ a natura Palmæ et Moschatæ
26 η a castratione florum
27 de ovis plantarum
28 de cotyledonibus
29 Clausula

### § I

Verno tempore, cum Sol almus ad terras boreales redit, iterumque in vitam corpora, hiberno frigore suppressa, revocat, ecce ! tum animalia omnia, sub hieme gravia et torpentia lætiora et alacriora fiunt, ecce ! tum aves omnes, quotquot hieme siluere, iterum cantare et garrire incipiunt, ecce ! tum insecta omnia ex latebris prorumpunt, in quibus sopita jacuere, quin ipse homo quasi novus reviviscit, haud inepte igitur Plinius Sole nihil utilius

Idem ille Sol gaudio omnium exhilarat vitam supra quam dici potest Tum Tetricem et Urogallum licet videre ludentes, pisces lasciviunt, atque animalia omnia in venerem ruunt

> Omnia vere vigent, et veris tempore florent,
> Et totus fervet veneris dulcedine mundus

Quid ? quod amore ipsæ tum plantæ afficiuntur, cum inter illas, et mares et feminæ, quin et hermaphroditi ipsi nuptias celebrant Hoc ipsum mihi jam in animo est enarrare, et ex ipsis plantarum genitalibus indicare, qui mares, quæ feminæ, qui hermaphroditi sint

### § II

Veteres Botanici, in densis tenebris errantes, in sexu aliquo plantarum investigando laborare videbantur mares et feminas distinguere cœperunt, sæpius vero tam infelici eventu, ut cum horrore demireris, aliter autem fieri non potuit, distinctionibus a crassitie et gracilitate caulis petitis sic, quæ separanda erant, conjunxerunt, quæ autem natura junxit, separarunt Quorum sententias qui cognoscere studet, dissertationem (modo hic ventilatam) 'de Nuptiis arborum' evolvat, in qua eorum omnium compendium est, quæ veteres de hac re dixerunt

## § III

Recentiores Botanici permagnam analogiam inter vitam humanam et plantas videre sibi visi sunt, illas scilicet suis quibusdam morbis, perinde ac nos affici, ut Cancro, Pernionibus Lumbricis, Acaris, Tabe, Peste &c [In Germania non longo abhinc tempore pestis quædam arbores infestavit, quæ plus detrimenti silvis attulit quam unquam securis] Ab iis observatum est, plantas abundantia nutrimenti luxuriari, defectu marcescere, calore solis, unde omnium vita est, expergefactas viridia explicare folia variosque flores, atque superbire haud minus quam nautæ qui festis diebus totas naves magnificis superinstruunt vexillis at ingruente frigida, vitæ omnis invida, hieme, arbores, sopore graves, pulchras omnique ornatu decoras vestes deponere, quemadmodum et insecta omnia sopita jacent, usquedum iterum veris calore excitentur Observatum quoque est, suam cuique plantæ esse magnitudinem atque ætatem, omnesque juventute steriles, media ætate fructuosissimas, senectute tabescere Malpigius et Grewius anatomiæ ope ostenderunt, plantis vasa, quibus succus nutricius circumferatur, et fibras aliasque permultas inesse partes, quæ analogiam cum animalium corporibus præbeant quotannis etiam proprio fructu sese multiplicare visæ sunt, quæ omnia illis cum animalibus communia sunt His innumerisque aliis de caussis facile concludere potuerunt, vitam vegetabilem fere æque perfectam esse quam animalem, et quamvis plantis sensus desit, non ideo dici posse eas vita carere Quis apoplectico vitam inesse neget, quamvis omnes sensus perdiderit?

## § IV

Huc usque progressi perbene intellexere organa generationis antea quærenda esse, quam plantarum in mares et feminas distinctiones fierent Et, cum fructum haberent, necessario inde sequebatur, quum natura simplicissima sit, semperque sibimet constans, etiam organa maris adesse debere, quæ hunc fructum vivificarent E regno enim animali scimus, ad omnem fœtum mares requiri, qui genituram emittant, qua ova impregnentur, priusquam in fœtum perfectum exire possint

## § V

Hanc imprimis rem eximius Vaillantius sibi explicandam sumsit, cui totam suam Methodum Botanicam superstruere in animo habuit, nisi triste fatum præmatura eum morte nobis eripuisset, die x Maji MDCCXXII Nonnihil tamen de hac re prius publici juris facere potuit, Sermonem scilicet *de structura et differentia florum, usuque partium eos constituentium* &c Lugd Batav MDCCXVIII 4to, Gallice, quem vero nondum vidi

## § VI

Si igitur scire velis utrum plantæ mares an feminæ sint, organa generationis, ut jam dictum est, inspicienda sunt Probe scimus, post florem fructum provenire, fructumque re vera fœtum esse, nullus fit fructus nisi flos prius fuerit, nullusque in regno animali fœtus sine prævio congressu, si igitur absque dubio flos æque necessarium est antecedens fructus, atque organa genitalia maris et feminæ fœtus, inde omnino sequitur, in flore necessario reperiri debere ipsa organa generationis, quæ in illo vicem maris et feminæ suppleant

§ VII

Cum igitur perspicuum sit, in flore plantæ genitalia inesse, omnibus plantis inter se comparatis, patebit, probatam esse veritatem, omnes, quæ pistillum cum rudimento fructus habent, feminas, contra, quæ stamina cum apicibus, mares, quæ vero utraque habent, hermaphroditos esse, quod posthac demonstrabo

§ VIII

Partes florum sunt

1 Calyx seu ollula, cui affixa sunt

2 Petala seu folia in ipsô flore,

3 Stamina, quibus semper insident

4 Apices seu antheræ,

5 Pistillum seu Stylus, qui insistit

6 Fructui, qui in Capsulam abit

§ IX

Omnes flores, mihi obvenientes, cum inspexero, permulta inveni genera quæ calyce careant, ut Tulipa, Mesonora, Fusai, Muscari, Hyacinthus &c, quorum tamen fructus maturescit et seri potest, calyx igitur non necessarius est ad fructificationem

§ X

Si quæris, an petala, in quibus Tournefortius Rivinus et alii Botanicen totam fundarunt, organa sint generationis facile invenies, eadem innumeris deesse floribus ut omnibus Apetalis, Stamineis et Amentaceis, e gr gramini Cyperoidi, Scirpoidi, Sparganio, Corylo, Quercui, Ficui &c &c Hi omnes semina fecunda proferunt, unde sequitur etiam petala parum ad fructum parandum conferre

§ XI

Si autem de staminibus cum apicibus, et pistillis cum fructu investigaveris, ea semper adesse invenies, his scilicet tribus modis

§ XII

*a* Maxima pars plantarum in uno eodemque flore et stamina et pistillum habent, ut Liliago[1], Tunica[2], Hottonia[3], Trientalis[4], Dortmanna[5], Hypopithys[6], Odontites[7], Subularia[8], Draba[9], Rorella[10], Portula[11], Stellaria[12], Trollius[13], Cynapium[14], Cracca[15], Corallorrhiza[16], Morocarpus[17] Pinastella[18], Scirpoides[19], Tetralix[20], Ledum[21], Pilularia[22], ceteræque fere omnes

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[1] Vaill

[2] Rupp

[3] Boerhav

[4] Rupp Fl Jen

[5] Rudb f Act Lit Sv

[6] & [7] Dillen N. pl g

[8] Rau Syn iii

[9] Dill N pl g

[10] Dill Cat

[11] & [12] Dill N pl g

[13] Rupp Fl Jen

[14] & [15] Rivin, pent, irr,

[16] Kram et Rupp

[17] Rupp

[18] Dill N pl g

[19] Mont

[20] & [21] Rupp

[22] Vaill

## § XIII

β Quædam plantæ flores duplicis speciei distinctos in uno caule habent, quorum altera species stamina et apices sine pistillis, altera pistilla tantum sine staminibus et apicibus habet, hi fecundi sunt, illi vero flores steriles Quorum perplures Tournefortius enumerat et 'Flores a fructu separatos in eadem planta,' vocat Corylus, e gr julos suos habet, qui per totam hiemem arbori insident, non autem maturescunt prius quam mense Martii aut Aprilis, cum e gemmis ejusdem arboris tenues cirrhi capillares, qui non nisi pistilla sunt, proveniunt et fecundantur a farina illa, quam eodem tempore superimpendentia emittunt nucamenta, quæ ex innumeris parvis staminibus cum suis apicibus constituuntur Quod ubi factum est, juli, quia inutiles, ex arbore decidunt, loco vero, quem pistilla parva occupaverant, nuces æstate sequente enascuntur Tournefortius, ut jam diximus, numerum magnum hujus generis enumeravit, multos tamen omisit, quos alii auctores postea observarunt, necesse igitur mihi videtur omissos heic enumerare Hi sunt

| AMENTACEI | PETALATI | APETALI |
|---|---|---|
| Juglans, Tournef | Cucurbita, P | Xanthium, T |
| Corylus, T | Cucumis, P | Ambrosia, T |
| Carpinus, T | Melo, P | Gnaphaloides, T |
| Fagus, T | Pepo, P | |
| Quercus, T | Melo-pepo, P | Myriophyllum, T |
| Ilex, T | Anguria, P | Buxus, T |
| Suber, T | Colocynthis, P | Empetrum, T |
| Castanea, T | Momordica, P | Ricinus, T |
| Taxus | Bryonoides[2] | Cynocrambe, T |
| Platanus, T | Sicyoides, P | Urticoides, P |
| Pinus, T | Viscus[3] | Ceratoides, T |
| Larix, T | Veratrum, P | Sparganium, T |
| Cupressus, T | Sagitta, Dillen | Typha, T |
| Thuya, T | Stratiotes, D | Mays, T |
| Cedrus, T | Caupesa, Plum | Lacrima, T |
| Alnus, T | Aurantium, P | Cyperoides, M[4] |
| Betula, T | Citrium, P | Acinaria[5] |
| Tenga, Ponted | Limonicum, P | Mnium, Dill |
| Chaunga, P | Punica, P | Lichen, Dill |
| Suddapana, P | Begonia, Plum | Ficus Hircus fil[6] |
| Katovindel, P | — — — | Coriaria, Nissol[7] |
| Dactyloides, P | Ricinoides, T | Blitum[8] |
| Moriformis[1] | Basella | Stellaria, Vaill |

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[1] Per *Moriformem* intelligo speciem unicam Mori, quod flores a fructu in planta eadem sejunctos profert, contra in aliis

[2] Per *Bryonoidem* vero Bryoniam Zeyland foliis profunde laciniatis T

[3] *Viscus*, teste Pontedera, flores fert a fructu remotos alii contrariam fovent sententiam

[4] *Cyperoides* probe distinguendum est a Scirpioide Monti

[5] *Acinaria* a me vocatur planta quædam exotica quæ ab eo dicitur Fucus folliculaceus fœnicul fol long in CB

[6] *Ficus* flores masculini tripartiti, feminini 5-partiti ambo in uno fructu nascuntur, sed masculini supra femininos Dill N pl g 182

[7] *Coriaria* vid descript nov pl g Dill 158

[8] *Blitum* album majus Dill 164

## § XIV

γ Alia tandem invenitur plantarum species, quæ nonnullis in stirpibus flores cum integris apicibus sine pistillis habet, in aliis autem speciei stirpibus flores cum pistillis sine apicibus hi fecundi, illi vero steriles sunt, utrique vero ex seminibus ejusdem speciei nascuntur Flores autem fecundi et steriles generis antecedentis in eadem radice eodemque caule gignebantur, hujus igitur generis flores ab illius in eo differunt, quod in radicibus distinctis nascuntur, quamvis facies externa fere eadem sit Has Tournefortius 'Plantas, quarum aliæ fructibus, aliæ floribus donantur,' appellat. Eas in diversas species distinguere velle, æque absurdum esset, ac si quis ovium aut canum marem et feminam in diversas species distingueret, præsertim si ab eadem matre nati essent Cannabis, ex gr ex ejusdem speciei seminibus cannabis et sterilis et fecunda oritur, flores cannabis sterilis stamina et apices habent, semina autem nulla proferunt, carent enim pistillo, at contra cannabis fecunda pistillum habet, sed neque stamina, neque apices, et semina profert Ejusmodi sunt

Sabina[1]
Salix, T
Populus, T
Juniperus, Volk
Gale, Vaill
Morus, P[2]
Terebinthus, T
Lentiscus, T
Rhamnoides, T
Casia, T
Palma, P
Ampanna, P
Mamœra, T
Urtica, P[3]
Mniodes[4]
Fraxinus[5]

Pulicaris[6]
Mercurialis, T
Spinacia
Lupulus, T
Cannabis, T
Cannabina, T
Ceratoides, T
Bryonia, P[7]

Tamnus, P[8]
Valerianella[9]
Cervispina[10]
Ornus, P[11]
Otites, Fab
Impia[12]
Papaja, P HM[13]
Laurus[14]

Anomalæ
duplices flores
præferentes

Opulus, Ruell
Atriplex
Parietaria
Limon
Acer
Arum

Helleborus
Trollius
Napellus
Cardamindum
Parnassia

## § XV

Vaillantius partes florum hoc modo declarat Fructum tenellum Ovarium appellat, quia eodem fungitur munere quo ovarium animalium, quod omnia in se includit semina seu ova progignenda Stylus seu Pistillum, huic insistens, Tuba dicitur ex analogia Tubæ Fallopianæ in regno animali Flores omnes qui habent ovarium cum tuba, quippe quæ organa sint sexus feminini, Feminas vocat Mares vero ab eo appellantur illi, qui stamina tantum et apices habent, namque stamina Vasa spermatica, et apices Testiculos vocat, quoniam per illos emittitur farina genitalis (pulvis, qui testiculis maturis excidit), quæ semina fecundat Semina Ova nominantur, cum totum futuræ plantæ rudimentum contineant Sterilis igitur Cannabis mas, fecunda vero femina est, etiamsi contrario modo nonnulli, sed false, disseruerint Hermaphroditi sunt omnes qui et testiculos et ova habent

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[1] *Sabina* Rupp i g marem et feminam exhibet

[2] *Morus* e g Morus fl albo I et Morus vulgaris sterilis Pont Morus insitiva fol maj et crassiore ex albo purpurascent P

[3] *Urtica* Pont Urtica maxim

[4] *Mnioiden* voco Mnium quod Raio recensetur distinctum esse sexu

[5] *Fraxinus*, observ Rupp 314 et experientia

[6] *Pulicaris*, per hanc intelligo Scirpioiden seminibus pulciformibus, quæ, ut mihi videtur, ex S K. (?) 497 sexu distincta [7] *Bryonia* sc aspera Rai

[8] *Tamnus* sc racemosus [9] *Valerianella*, Val palustris minor

[10] *Cervispina* s Rhamnus catharticus, observante Dillenio

[11] *Ornus* s Fraxinus humilior s alt Theophrast [12] *Impia*, Plin

[13] *Papaya*, Tournef in eadem, Hort. Mal et Pont in diversa collocant flores [14] *Laurus* Rupp 85

## § xvi

Petala ipsa generationem non juvant, sed tori instar habenda, quem Creator tam magnifice distinxit, tot splendidis exornavit conopeis, et tot suavibus implevit odoribus, ut sponsus sponsaque tanto majore cum sollennitate nuptias ibi celebrent Toro nunc ita strato, sponsus tandem sponsam amplectitur caram eique dona sua largitur Tunc testiculi se aperire videntur, pulverem effusuri genitalem, qui in tubam decidens ovarium imprægnat

## § xvii

Maximam partem plantarum hermaphroditos esse nulli mirum videatur, quum idem in classe regni animalis infima spectandum se præbeat, omnes scilicet cochleas similem genitalium in uno individuo conjunctionem habere, et id quidem propter tardiorem ipsarum motum, qui segnitiam prodit, quæ quidem tanta est ut totum genus periret priusquam conjux alter alteri occurreret, nisi natura hoc modo segnitiam earum compensavisset Plantas, quas longe firmius in loco defixit, natura hermaphroditos fecit

## § xviii

Fecundatio quomodo fiat, difficilius est demonstratu Morlandus, qui ex professo animum in id intendit ut hanc rem illustraret, judicavit farinam seminalem tot parvulis plantis seminalibus constare, quot ibi grana essent, quæ per infundibulum et tubam in ovarium effunderentur, ibique vacua inirent semina eademque parvulis plantis seminalibus implerent, et hoc modo semina fecundarent Argumentum hujus sententiæ diversa præbuit figura, quam in farina testiculorum in singulis speciebus observandis oculo armato contuitus est, et notavit, particulas farinæ istius æque inter se distinctas esse, ac ipsarum plantarum facies externa in diversis speciebus Figuræ hujus pulveris in Act Erud Lips 1705, p 275, inveniuntur Cum vero irrita facta sit thesis Leuwenhoekii, quæ statuit genituram maris, plenam innumeris vermiculis, quos homunciones in homine esse dixit, exire e testiculis virorum in ovarium feminæ, unum vero horum vermiculorum in cicatriculam ovi, tunc vacuam, irrepere, et, ovo in uterum immisso ibi in fœtum perfectum accrescere hac, ut diximus irrita facta, quandoquidem probatum est cicatriculam ovi non vacuam esse, sed omne rudimentum futuri fœtus cum fibris suis primordialibus in ea contineri ante fecundationem, non minus in animalium quam plantarum ovis, in nihilum etiam redacta est ante allata sententia Morlandi, qui hac in re Leuwenhoekium imitari conatus est

### § xix

Fecundationem fieri perspicuum nobis est, licet modum ejus oculis subjicere non possimus Quis enim tam inconsideratus, ut credat genituram maris ovum feminæ non vivificare in regno animali, ideo quod nondum satis demonstrari possit, quomodo fiat ? Sed quia unicuique de conceptu animalium facilius persuadetur quam plantarum, experimenta quæ sequuntur mihi auxilio erunt

### § xx

*α* Quidam florum tubam habent longam, brevia vero vasa spermatica, quare farina genitalis sursum ferri et in infundibulum tubæ immitti non posse videtur, præsertim cælo humido et pluvioso, ingruente vero tempore, quo subtilis farina e testiculis decidit, infundibulum tubæ ad testiculos se incurvat (quod quidem artificium est sapientissimi Creatoris, maxima dignum admiratione) ut imprægnetur, haud multo aliter quam papilio femina, quæ, cum a marito quæritur, prosternit se humi extensis alis, caudamque in altum tollit quo commodius amplexum ejus recipiat Deinde, cum tuba hujusmodi florum incurvata fuerit, donec farina e testiculis effundi destiterit in altum rursus se tollit Quid igitur opus esset ut tuba se incurvet ad testiculos eo ipso tempore quo farina effunditur, et hac effusa erigatur, nisi ut a farina fecundetur ?

### § xxi

*β* Agricolæ omnes narrare solent, spicas minus ditari granis, cum pluerit eo tempore quo seges fumat Qui quidem fumus nihil aliud est nisi segetis farina seminalis e testiculis exiens ut tubis adhærescat, a pluvia vero humi funditur unde major vel minor sterilitas

Hortulani omnes prædicere norunt, fructum haud proventurum esse cum pluvia in flores effusa fuerit, ut mala, pira, pruna, cerasa, fabæ &c , quod etiam de plantis sponte crescentibus valet

### § xxii

*γ* Maxima pars plantarum, testiculos ab ovario sejunctos in eadem planta habentium (§ xiii ), flores masculinos in eodem caule supra flores femininos habet, ut farina testiculorum in tubas decidat commodius, quam si flores feminini locum superiorem tenerent, et ita farina sursum tenderet Ex gr Mays, Typha, Cyperoides, aliique castrari possunt

### § xxiii

*δ* Ut accuratius summi Creatoris perspicias providentiam, jucundum erit observare, omnium arborum amentacearum æque flores ipsos masculinos in nucamentis suis, ac flores femininos seu cirrhos enasci et præparari, quo farina genitalis decidat in tubas easdemque fecundet prius quam folia harum arborum explicentur, quippe quæ alias tubas tegerent, adeoque aditum farinæ prohiberent. Exempla nobis sunt Corylus, Juglans, Quercus et Fagus

§ XXIV

ε Tubam maxime florescere eo tempore quo farina e testiculis effunditur, videmus Testiculi vero officio suo functi, cum genituram tradiderunt, marcescunt cum vasis suis spermaticis, et decidunt, quum inutiles sint Non multo post flaccescit etiam tuba, jam inutilis, restat autem ovarium, donec semina matura protulerit Inter papiliones etiam animadvertimus, mares statim post congressum emori, feminas autem vivere donec ova ediderint, paullo vero post perire

§ XXV

ζ Multi veterum auctorum historiæ naturalis de natura Palmæ mentionem faciunt, marem scilicet dicunt ramos super feminam expandere, ut fecunda fiat, cum aliâs sterilis esset, ea certissime de caussa, quod farina maris tam gravis est, ut a vento agi non possit, directe igitur in tubam decidere debet, si quidem farinæ particeps futura sit Mares quoque et feminæ arboris Moschatæ observantur Si mares quidam inter feminas crescunt, tum feminæ fecundæ sunt, steriles autem fiunt si mares exciduntur Hæ vero observationes de Palma et Moschata aliorum modo narrationibus nituntur

§ XXVI

η Unum tantum experimentum, quod, ut spero, ad rem probandam sufficiet, addere lubet Omnes si sustuleris testiculos floris hermaphroditi, ovarium quidem plantarum quarundam semina fert, sed plane infecunda, quæ nunquam progerminant etiamsi solo vel fertilissimo disseminata fuerint Maxima autem heic diligentia adhibenda est, ut testiculi amoveantur priusquam pulverem genitalem emittere cœperint, et ut flores nulli ejusdem speciei vicini sint, aliâs ventus subtilem farinam seminalem in tubam relictam asportat En igitur heic veram plantarum castrationem artificialem ! Equidem non ignoro Pontederam observasse, Morum feminam baccas in Itâlia tulisse in horto quodam, quamvis nullus mas intra spatium quinquaginta milliariorum esset, ostendere autem non potuit, eundem fructum fecundum fuisse, seu, si seminatus fuerit, Moros parvas protulisse Ex his omnibus certissime colligi potest, fecundationem fieri per testiculos eorumque farinam seminalem, nulla igitur caussa subest, cur sexus plantarum denegetur

§ XXVII

Restat jam analogiam inter semina plantarum et ova animalium probare Non opus est, ut omne ovum testa dura et calcarea sit obductum, quemadmodum ova avium, omnium enim quadrupedum et ipsius hominis ova eandem desiderant Neque albumen et vitellum necessaria sunt, quæ non in omnium piscium ovis reperiuntur, sed heic, ut pars maxime principalis, necessario requiritur parva cicatricula, quæ in omnibus conspicitur ovis, et accuratissime in ovo magnæ cujuslibet avis, ubi statim in conspectum venit, si testam a latere aperias In hac cicatricula omnia rudimenta futuri fœtus sub minima mole convoluta jacent Semina quoque omnia cicatriculam habent, quam auctores quidam Hilum appellant Pisa nonnulla punctis ni gris distincta sunt; quæ quidam Hilum esse, sed falsissime, putarunt, puncta enim hæc nihil aliud sunt quam cicatrices pediculi fracti, qui pisa leguminibus infixit, juxta hæc vero tuberculum prominet, instar rostri in Cicere et Staphylodendro permagnum, quod vera est cicatricula, in qua omnes fibræ primordiales plantæ proventuræ latent Malpigius in semine Caryophylli totam arborem Caryophylli sub minuta forma cum caule, foliis, radice &c inesse ostendit Nulli mirum videatur, hæc semina a me ova appellari, octoginta enim ante me annos celeberrimus Harveus idem nomen dedit, cum generationem æquivocam refutando palam exclamaret Omnia ex ovo

Ova plantarum in terra excluduntur, eodem modo quo ova avium sub alis, quadrupedum in utero, et piscium in aqua

§ XXVIII

Planta primum ex ovo suo progerminans duo exserit folia, Cotyledones nominata, ex analogia quæ inter illa et placentas animalium, seu cotyledones, vaccarum et similium, locum obtinet Hæ duæ cotyledones, antea inter membranas ovi occultæ basin ejus constituerunt, et munere eodem heic funguntur quo vitellum in ovis avium, quod in placentam fœtus tenelli abit Postquam teneræ illæ cotyledones apud embryonem parvum vicem impleverunt placentarum, decidunt simul atque ipse e terra se alere possit, quemadmodum placentæ animalium flaccescunt, cum fœtus se ipsum alere inceperit

§ XXIX

Hæc sunt quæ breviter et sine ulla librorum evolutione, summa cum festinatione communicata volui de Sexu Plantarum, qui etiam particula quædam est Botanices, seu Scientiæ Divinæ, sic dictæ, quippe quæ exponit ea quæ Deus inter omnes res creatas tam magnifice fecit

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## PROCEEDINGS OF LEARNED SOCIETIES

### ZOOLOGICAL SOCIETY

Dec 12, 1843 (*continued*) —Wm Yarrell, Esq , V P , in the Chair

"Descriptions of new species of Shells figured in the 'Conchologia Iconica,'" by Mr Lovell Reeve

Conus Deshayesii *Con testâ cylindraceo-ovatâ tenuiculâ, inflatâ, pallidè olivaceo-fulvâ, profuse rubido-puncticulatâ, maculis albis grandibus, perpaucis, sparsim et irregulariter nebulosâ, spirâ depresso-planâ, apice mucronato, aperturâ dehiscente, fauce, quasi politâ, nitente*

Conch Icon , *Conus*, pl 5 f 28 , *Conus cervus*, Sowerby, Conch Illus , f 94

*Hab* Swan River

Only a few specimens of this very characteristic species, which may be readily recognised by its peculiar buff-tinted colour and light inflated growth are at present known It has been supposed hitherto to be the *Conus cervus* but having lately examined, in the collection of M Delessert, the identical shell described under that title by Lamarck, with the description of that illustrious author attached to it in his own handwriting, I am enabled to rectify an error which has unfortunately gained considerable circulation

By the title now substituted for *cervus* in reference to the species under consideration, I wish to honour my kind and amiable friend M Deshayes, now zealously occupied in completing the conchological portion of the new edition of Lamarck's 'Histoire des animaux sans vertebres,' the publication of which has been long anxiously looked for

CONUS VIDUA. *Con testâ turbinatâ, albâ, fusco subtilissimè reticulatâ reticulis ruptis, subsparsis, fasciis binis nigerrimo fuscis maculis albis sparsis, irregulariter punctatis, cinctâ, spirâ concavo depressâ, coronatâ, apice subobtuso*

Conch Icon , *Conus*, pl 8 f 45

*Hab* Island of Capul, Philippines (on the reefs) , Cuming

This curiously mottled Cone presents a very different style of painting from any hitherto described species Several specimens were collected by Mr Cuming

CONUS PICTUS *Con testâ oblongo-turbinatâ, tenuiculâ, subventricosâ, puniceo brunneove et albo alternatim fasciatâ fasciis interstitiisque fusco alboque identidem tæniatis et variegatis, spirâ convexo-elatâ, ad marginem peculiariter strigatâ, aperturâ subinflatâ*

Conch Icon , *Conus*, pl 18 f 98

*Hab* —— ?

The painting of this pretty shell is of very peculiar character, and I know of no other species with which any comparison can well be instituted The most characteristic of two specimens now before me exhibits three broad pale scarlet bands, the lower being ornamented with two articulated fillets of brown and white, the middle with one only, whilst in the upper band the fillet is altogether wanting The spaces between the bands are curiously variegated with brown (scarlet-brown) and the base and upper edge of the shell are obliquely streaked with the same colour , the latter part in such a manner as to leave a neat spiral necklace of short streaks upon the surface of the spire In some specimens the articulated fillets are more confused, though the necklace of short streaks is still clearly defined around the edge of the spire

CONUS MAHOGANI *Con testâ elongato-turbinatâ, subcylindraceâ, basim versus sulcatâ , albidâ, spadiceo profusè tinctâ, tæniis frequentibus spadiceo alboque articulatis cinctâ , spirâ valdè elatâ, aperturæ fauce albâ*

Conch Icon , *Conus*, pl 22 f 126

*Hab* Salango, West Columbia (found in sandy mud) ; Cuming.

This species differs from the *Conus interruptus* in having the spire narrower and much more elevated, it is always more strongly and fully stained with the dark reddish-brown, and the interior of the shell exhibits no indication of any purple

**Conus intermedius** *Con testâ elongato-turbinatâ, subcylindraceâ, lævi, columellâ basim versus subtiliter sulcatâ, puniceo roseâ, maculis grandibus fuscescentibus reticulatis, interruptè bibalteatâ, interstitiis plus minusve pallidè reticulatis, spirâ convexo-elatâ, spiraliter striata, aperturâ patente, fauce pallidè violaceâ*

Conch Icon, *Conus*, pl 23 f 129, *Conus geographus, var*, Broderip, Sowerby, Conch Illus, f 33

*Hab* Island of Annaa Pacific Ocean (found on the reefs), Cuming

I have long suspected this shell to be distinct from the *Conus geographus* it differs constantly in form, in colour, and in the general distribution of the brown reticulated painting These differences are unimportant however compared with a character which it has in common with the *Conus tulipa*, namely that of having the lower portion delicately grooved The base of the *Conus geographus* does not present the slightest indication of this grooving, nor indeed any inequality of surface beyond the ordinary striæ of growth, which pass in the contrary direction I notice this character in the *Conus intermedius* merely to show that it cannot be a variety of the *Conus geographus*, the grooving must not be regarded as a specific peculiarity, because, as already observed it is common to the *Conus tulipa* as well as to another closely allied species, the *Conus obscurus*

**Conus orbitatus** *Con testâ oblongo turbinata, tenuiculâ, transversim liratâ, liris planis, interstitiis striato pertusis, albidâ, ustulato-fusco variegatâ, spira acuminatâ, apice elato, acuto*

Conch Icon, *Conus*, pl 27 fig 156

*Hab* ——?

I kindly thank M Deshayes for the use of this interesting little shell, which at first sight I thought to be a young specimen of the *Conus sulcatus*

**Conus elongatus** *Con testâ elongato turbinatâ, lævi, luteo-olivaceâ, superne cæruleo-albâ, fasciâ interruptâ subindistinctâ deorsum cingulatâ, spira convexâ, cæruleo albâ subtilissimè coronatâ, apice rosaceo, basi et aperturæ fauce vivide violaceis*

Conch Icon, *Conus*, pl 27 f 157

*Hab* ——?

I adopt the Rev Mr Stainforth's manuscript name for this elegant little shell, believing that it may with great propriety be regarded as a new species

**Conus iodostoma** *Con testâ subelongato-turbinatâ, tenui, leviter inflatâ, albidâ, purpureo pallidissimè tinctâ, luteo-fuscescente sparsim et irregulariter punctatâ et maculatâ, spirâ subtilissimè sulcatâ, apice elato acuto, aperturâ latiusculâ, fauce violaceo-purpureâ*

Conch Icon, *Conus*, pl 28 f 159

*Hab* ——?

This shell has been supposed to have some considerable affinity with the *Conus Janus*, it does not however, in my opinion, exhibit any characters in common with that species, and may at once be distinguished by its tenuity, by its spotted peculiarity of painting, and by its violet stained mouth

Conus inscriptus *Con testâ turbinatâ, solidiusculâ, lævi, basim versus sulcatâ, sulcis latis, striatis, cæruleo-albidâ, maculis grandibus fuscescentibus, literis Sinensibus simillimis, trifasciatim inscriptâ, interstitiis macularum minorum serie unicâ cingulatis, spirâ mediocri, spiraliter striatâ, fuscescente variegatâ, apice acuto, aperturæ fauce violaceo carneolata*

Conch Icon , *Conus*, pl 29 f 164 , *Conus leo scandens ?* Chemnitz, Conch Cab , vol x pl 140 f 1300

*Hab* ——?

This appears to me to be a well-characterized species, and clearly distinct from that variety of the *Conus Proteus* to which it so closely approximates in the style of painting I much question whether the figure described by Chemnitz under the title of "*Leo scandens*," from an imagined resemblance of the hieroglyphical spots to the common heraldic device of the climbing lion, is not a representation of this shell, and that Lamarck Pfeiffer and others have somewhat erred in quoting it as the well-known similarly marked variety of *C Proteus*

Conus bulbus *Con testa subobeso-turbinatâ, solida, superne rotundatâ, albâ, fusco longitudinaliter strigatâ, strigis irregularibus, oblique undulatis, supernè et infernè diffusis, spirâ brevi, apice mucronato*

Var β *Testa omninò fusca*

Conch Icon , *Conus*, pl 30 f 169

*Hab* Cabenda, west coast of Africa (found at the depth of five fathoms in soft mud, washed down by the waters of the Congo), Hankey

Four specimens of this very interesting species were collected at the above-named locality by Lieut Hankey It is a very solid shell, having the appearance of a small bulb-root

Conus aplustre *Con testâ subobeso-turbinatâ, tenui, subinflatâ, lævi, basim versus lirata, rubido-fusco et cæruleo pallidè et subirregulariter zonatâ, tæniis fusco-articulatis angustis numerosis subtilibus ornatâ, spirâ depresso-convexâ, apice mucronato*

Conch Icon , *Conus*, pl 30 f 170

*Hab* ——?

This is another new species, and will be recognised as being very distinct from any hitherto described

Conus Metcalfii *Con testâ elongato-ovatâ, per totam superficiem granulosâ, granulis subtilibus, seriatim digestis, albidâ, aurantio-fusco irregulariter inquinatâ, balteâ albidâ angustâ in medio cingulatâ, spirâ subexsertâ, aurantio-fusco maculatâ, apice acuminato*

Conch Icon , *Conus*, pl 36 f 192

*Hab.* ——?

I have much pleasure in naming this interesting species, at the desire of the Rev Mr Stainforth, in honour of William Metcalfe, Esq , a gentleman whose zeal for collecting and identifying the more minute and less attractive species of shells is highly serviceable to science

Conus Victoriæ *Con testâ ovato-turbinatâ, tenui, subinflatâ, transversim striatâ, albidâ, cæsio longitudinaliter inquinatâ, maculis grandibus, subsolitariis, aurantiis, fusco undulato-virgatis, trifasciatim ornatâ, interstitiis aurantio fusco subtilissimè reticulatis, spirâ elevato-exsertâ, apice acutissimo, aperturâ latiusculâ, fauce pallidè cæsiâ*

Var β *Testa maculis aurantiis majoribus, trifasciatim coalescentibus, strigis fuscis longitudinalibus prominentioribus*

Conch Icon , *Conus*, pl 37 f 202

*Hab* Mouth of the Victoria River, New Holland , H M S *Beagle*

This highly interesting species must be seen to be appreciated, it being quite impossible to do justice either by drawing or description to its elaborate configuration It is perhaps next allied to the *Conus canonicus*, but is of much lighter and more inflated growth , the three rows of brown-striped orange blotches are peculiar to it , the net work is finer, and of a much more delicate and tremulous character, and the interior of the aperture, instead of being pink, is of the same greyish blue colour which characterizes the outer surface

I take the liberty of attaching Her Majesty's name to this beautiful shell, from the circumstance of its having been lately discovered in a locality dedicated in like manner to the same fair patroness of the sciences

The two specimens here figured, recently in my possession were collected during the late surveying expedition of H M S *Beagle* Mr Cuming and the Rev Mr Stainforth each possess several examples

Conus scalptus *Con testâ turbinatâ, solidiusculâ, politâ, basim versus sulcatâ, albidâ filis rubidis numerosis, rariter interruptis, cinctâ, spirâ elevatâ, spiraliter striatâ, rubro variegatâ, apice acuto*

Conch Icon , *Conus*, pl 37 f 203

*Hab* —— ?

This is a new and very distinct species , the transverse lines exhibit the appearance of scratches and are very characteristic M Chenu of Paris proposed describing this shell under the title of C *radiatus*, but that name has been applied to another species by Gmelin, though not acknowledged

Conus mucronatus *Con testâ acuminato turbinatâ, basim versus attenuatâ, transversim sulcatâ, sulcis striis longitudinalibus cancellatis, albidâ, fusco pallidè tinctâ et variegatâ, spirâ elato-exsertâ, fusco pallidè maculatâ, apice mucronato, acuto*

Conch Icon , *Conus*, pl 37 f 204

*Hab* Islands of Burias, Siquijor, Penay, &c , Philippines , Cuming

Several examples of this species have been collected by Mr Cuming, varying remarkably in their general appearance, most of them are obsoletely coronated, and all have the grooves more or less strongly developed, with the apex remarkably sharp-pointed *Coni sulcatus* and *orbitatus* are the nearest allied species

CONUS CUNEOLUS *Con testá abbreviato-turbinatá, supernè obesá, subinflatá, fuscá, maculis albidis paucis parvis, irregularibus, subtrigonis, fasciatim aspersá, fasciá albidá fusco pallidè strigatá, interdum subobsoletá, infra medium ornatá, spirá convexo-obtusá*

Conch Icon, *Conus*, pl 37 f 205

*Hab* ——?

This apparently variable species approximates in some degree to the *Conus mercator*

CONUS VERRICULUM *Con testá cylindraceo turbinata, ventricosá, subrotundatá, lævi, basim versus striata, albidá, maculis aurantiis irregularibus bifasciatim cinctá, aurantio-fusco aliter latissime reticulatá, maculis lineis undulatis nunc transversim, nunc longitudinaliter strigatis, spirá concavo-acuminatá*

Conch Icon, *Conus*, pl 38 f 208

*Conus textile*, var *l*, Lamarck

*Hab* Ceylon, &c

Many persons will no doubt cavil at my attaching a new specific name to this long-established variety of the *Conus textile* but how can Lamarck's *Conus vicarius* stand, unless this shell be elevated to the same rank? Its inflated growth and the wide open character of the net-work are somewhat constant, and it may as well be noticed that the *Conus verriculum* has long been erroneously set apart by collectors for the *Conus archiepiscopus*, a very different shell, and one of much greater rarity Either the *Conus verriculum* must be adopted, or the *Conus vicarius* must be rejected, and both considered as varieties of the *Conus textile*

There can be no law for the adjudication of species, whilst a species remains to be defined If the *Coni vicarius* and *verriculum* be discarded hundreds of species may be banished in like manner from the nomenclature, as the links in the grand chain of affinity between the *Aspergillum* and the *Argonaut* become gradually revealed to observation

CONUS MARTINIANUS *Con testá cylindraceo-turbinatá, fuscá, vel luteolo-fuscá, ad basim, et per spiræ marginem, albidá, lævi, infrà medium sulcatá, sulcis latiusculis, subdistantibus, striis prominentibus, cancellatis, spirá convexá, spiraliter sulcatá, sulcis numerosis, angustis apice elato, acuto*

Conch Icon, *Conus*, pl 40 f 217

*Conus teres lævis*, Martini, Conch Cab, vol ii p 293 pl 53 f 58, *Conus lacteus, var* ? Lamarck

*Hab* Putao, province of Albay, island of Luzon, Philippines (found under stones at low water), Cuming

This species has been either injudiciously confounded by Lamarck with the *Conus lacteus*, or it has been altogether neglected Martini has given a very accurate figure of it, but his irregular style of nomenclature precludes the possibility of our following the title by which he distinguished it The *Conus spectrum* is described by that author under the name of *Conus teres* and this immediately follows under that of *Conus teres lævis*, the former is however a shell of a more inflated growth, and distinguished moreover by markings of which the *Conus Martinianus* is entirely destitute Most specimens exhibit a longitudinal white streak here and there, running parallel with the lines of growth

CONUS INCARNATUS *Con testâ turbinatâ, vix pyriformi, basim versus subtilissime liratâ, liris numerosis, confertis, albâ, fasciis duabus latissimis, pallidè incarnatis cinctâ, spirâ convexiusculâ, spiraliter incisa, maculis incarnatis arcuatis pallidè variegatâ, apice mucronato elato*

Conch Icon *Conus*, pl 41 f 221

*Hab* Malacca (found on mud banks), Cuming

Although the specimen above described is in the best state of preservation, I should have judged it, from its simple style of colouring, to be a shell of immature growth, were it not that Mr Cuming collected several specimens of them at Malacca on the mud-banks, all exhibiting the same uniformity of external character

CONUS BÆTICUS *Con testâ turbinata, solidiusculâ, lævi, basim versus granulosâ, alba, punctis maculisque grandibus, bæticis, vivide pictâ, spira subobtuso-convexa, obsolete coronatâ, spiraliter sulcatâ sulcis striato-cancellatis*

Conch Icon, *Conus*, pl 42 f 226

*Hab* Philippine Islands, Cuming

The *Conicus bæticus* exhibits no other colour but that of the dots and blotches, which are of very dark chocolate-brown upon a white ground

CONUS EPISTOMIUM *Con testâ elongato turbinatâ, rectâ, tenuiculâ, albâ, maculis aurantio-fuscis, peculiariter fluentibus, bifasciatim cinctâ maculis albo subobsoletè transversim punctato-lineatis, spira depressiusculâ, fuscescente maculatâ*

Conch Icon, *Conus* pl 42 f 227

*Hab* Mauritius

This shell is of a peculiarly straight form, and reminds one very forcibly of the spigot or faucet stop of a barrel, the very faint white dotted transverse lines are exceedingly regular, and of quite a different character to those of the brocade species

CONUS COCCEUS *Con testâ turbinatâ, supernè obesiusculâ, subrotundatâ, transversim subtilissime liratâ, interstitiis leviter pertusis, albâ, liris maculis parvis irregularibus, pallidè cocceis, eximiè tæniatis, spirâ obtuso-convexâ*

Conch Icon, *Conus*, pl 42 f 228

*Hab* New Holland

Mr Cuming possesses three specimens of this delicately marked Cone, the entire surface of which is covered with faintly articulated fillets of white and scarlet

Conus Clerii *Con testâ turbinatâ, supernè acutangulâ, tenuiculâ, per totam superficiem subtilissimè lirata, albâ, strigis fuscescentibus, longitudinaliter undatis, subirregulariter variegatâ, spirâ depressiusculâ, leviter canaliculatâ, apice elato, mucronato*

Conch Icon , *Conus*, pl 43 f 229

*Hab* Cape St Thomas, Brazils (found in sandy mud at the depth of thirty-five fathoms) , Clery

I have much pleasure in adopting the name of an intelligent French naval commander, to whom we are indebted for this, and many new and interesting species of shells

Conus piperatus *Con testâ subabbreviato-turbinatâ, basim versùs sulcatâ , albâ, maculis fuscis parvis sparsis irregulariter ornatâ, spirâ convexâ, spiraliter striatâ, apice mucronato, elato , aperturæ fauce fuscescente tinctâ*

Conch Icon , *Conus*, pl 43 f 230 *Hab* —— ?

The *Conus erythræensis* is perhaps the nearest allied species to this, well characterized by the stained interior, and the more dotted style of the external painting

Conus Gruneri *Con testâ turbinatâ, supernè lævi, infrà transversim sulcatâ, sulcis prominentibus , albâ, maculis subquadratis rubris trifasciatim tæniatâ, intervallis punctis rubris minutissimis aspersis , spirâ depresso-planâ, spiraliter canaliculatâ, basi intus extusque nigricante-violaceo tinctâ*

Conch Icon , *Conus*, pl 43 f 231

*Hab* Island of Java

This is a beautiful little species, very distinct from any hitherto described At the request of Mr Cuming I have named it after M Gruner of Bremen, a very zealous collector, whom I thank most cordially, not only for the loan of the shell, but for setting an example which I trust continental amateurs will not fail to profit by

There is another specimen, of rather larger size, in the cabinet of Mr J E Gray of the British Museum

Conus sindon *Con testâ subventricoso-turbinatâ, læviusculâ, albidâ, lineis rubido-fuscis subtilissimis densissimè bifasciatim decussatâ , spirâ subobtuso-convexâ, apice rosaceo*

Conch Icon , *Conus*, pl 43 f 233

*Hab* —— ?

This interesting shell, for the loan of which I am indebted to the zeal of Mr Adamson of Newcastle, is very distinct from any hitherto described species The painting viewed through an ordinary lens suggests the appearance of very fine lawn or cambric linen, and is of a quite novel character

Conus Parius *Con testâ turbinatâ, solidâ, supernè obesâ, basim versus sulcatâ, sulcis distantibus latiusculis, densissimè striatocancellatis , marmoreo-albâ , spirâ plano-convexa, lævi, apice mucronato, fuscescente*

Conch Icon , *Conus*, pl 43 f 235

*Conus spectrum album*, Chemnitz, Conch Cab , vol x pl 140 f 1304 , *Conus columba, var c*, Lamarck, Enc Méth , pl 331 f 3

*Hab* —— ?

This shell, which is of a solid, shining white (like the celebrated marble of Paros), has been evidently confounded with the *Conus columba*, it requires however no very great exercise of critical discrimination to perceive that it differs materially both from that and the preceding species

Conus exaratus *Con testâ turbinatâ subangustâ, per totam superficiem sulcatâ, sulcis regularibus, latiusculis, interstitiis subtilissimè striato cancellatis, pallidè cæruleo purpureâ, maculis ferruginosis albinubeculatis, perpaucis, parcis, sparsim ornatâ, spirâ acuminatâ*

Conch Icon, *Conus*, pl 44 f 238

*Hab* ——?

This is a very distinct species, remarkable for the regularity with which it is grooved

Conus ustulatus *Con testâ subelongato-turbinatâ, supernè tumidiusculâ, margine rotundatâ, transversim subtilissimè liratâ, pallidè ustulato rubidâ, balteâ albidâ angustâ in medio cinctâ, spirâ convexâ, spiraliter striatâ, maculis perpaucis sparsis purpureo-rubris ad marginem superiorem ornatâ, apice mucronato*

Conch Icon, *Conus*, pl 44 f 239

*Hab* New Holland

There is no trace of any purple-red spots or other dark character on the body of the shell

Conus aculeiformis *Con testâ elongato-turbinatâ, subfusiformi undique sulcata, sulcis subtilissime striato-cancellatis nunc angustis, liris intermediis planis latiusculis, nunc latioribus, liris intermediis rotundatis angustis, albida, fuscescente punctatâ, maculis fuscescentibus biseriatim cinctâ, spirâ acuminatâ, apice elato, acuto*

Conch Icon, *Conus*, pl 44 f 240

*Hab* Cagayan, island of Mindanao, Philippines (dredged from sandy mud at the depth of from twenty-five to thirty fathoms), Cuming

The specimens collected by Mr Cuming at the above-mentioned island are mostly smaller than those here figured

Conus violaceus *Con testa elongato-turbinatâ cylindraceâ, tenui nitidâ, violaceâ, transversim obsoletè fuscescente punctato-lineatâ fuscescente longitudinaliter strigata, aut sparsim maculatâ, strigis subdistantibus, lineis brevibus fuscescentibus, exiliter albiarticulatis, ornatis, spirâ rotundato-obtusâ, spiraliter striata*

Conch Icon, *Conus*, pl 44 f 241

*Hab* Matnog, island of Luzon, Philippines (found on the reefs), Cuming

This is a very interesting species, the faint dotted lines with which the entire shell is encircled are scarcely visible on the violet ground without the assistance of an ordinary lens, but in passing over the longitudinal streaks of light brown they present a more decided appearance

Conus tabidus *Con testâ turbinatâ, leviter pyriformi, tenui, un-*

*dique sulcatâ, sulcis basalibus latioribus, profundis, alteris irregularibus, subtilissimis, undulatis, albâ, tota superficie striis longitudinalibus elevatis peculiariter sculptâ, spirâ subobtuso-convexâ obsoletè coronatâ*

Conch Icon , *Conus*, pl 44 f 243

*Hab* ——?

I am not aware that the raised longitudinal striæ with which this shell is so delicately sculptured are to be found in any other species of the genus

Conus ambiguus *Con testâ turbinatâ, lævi, basim versus liratâ, lineis subtilissimis, undatis, longitudinalibus, subobsoletè incisis, albâ, pallidè fuscescente tinctâ, spirâ obtuso-convexâ, leviter canaliculatâ, maculis arcuatis fuscescentibus ornatâ, apice mucronato, elato*

Conch Icon , *Conus*, pl 44 f 244

*Hab* ——?

There is always a doubtful character about shells exhibiting faint indications of colour, I have not, however, succeeded in referring this to any species hitherto described

Conus lentiginosus *Con testâ fusiformi turbinatâ, tenuiculâ, lævi, basim versus sulcatâ sulcis latiusculis profundis, albidâ fuscescente lentiginosâ et punctatâ, spirâ elatâ, anfractibus acutangulis marginibus fuscescente maculatis, maculis subdistantibus, labro subexpanso, juxta spiram emarginato*

Conch Icon , *Conus*, pl 44 f 245

*Hab* ——?

This is an interesting and important species, of which there is a fainter specimen, of more elongated growth, in the collection of Mr Adamson of Newcastle

Conus trochulus *Con testâ abbreviato turbinatâ, obesâ solidâ, lævigatâ, basim versus sulcatâ, albâ, aperturæ fauce rubido violaceo tinctâ, spirâ obtuso-convexâ, lævigatâ*

Conch Icon , *Conus*, pl 45 f 246

*Hab* ——?

This species, of which there are several examples in the British Museum, all with the violet-tinged aperture exhibits the same contrast of colour as a very peculiar white variety of the *Conus nivosus*

Conus sugillatus *Con testâ turbinatâ, solidiusculâ, lævigatâ, basim versus subobsoletè noduloso-liratâ, albidâ, fasciis duabus latissimis livido-olivaceis, lineisque exilibus fuscescente-punctatis, cinctâ, spirâ plano-convexâ, canaliculatâ, apice mucronato, elato, anfractuum marginibus subtilissimè obliquè nodulosis, basi et aperturæ fauce violaceo tinctâ*

Conch Icon , *Conus*, pl 45 f 247

*Hab* ——?

This shell may probably have been confounded with the *Conus lividus*, it is, however, quite distinct from that species both in the detail of the painting and in the structure of the spire The spire is canaliculated, and very peculiarly beaded with fine oblique nodules, the canaliculated surface being of an olive-brown colour, whilst the nodules are white

**Conus suturatus** *Con testâ subabbreviato-turbinatâ, solidiusculâ, lævigatâ, basim versus sulcatâ, sulcis latiusculis, distantibus, albâ, basi pallidè rosacea, spirâ plano-convexa, profundè suturatâ, spiraliter liratâ et striatâ, apice minuto, acuto*

Conch Icon, *Conus*, pl 45 f 250

*Hab* —— ?

There is a very peculiar character on the spire of this shell, the sutures have an unusually decided appearance, in consequence of a small ridge which each whorl throws up at its junction with the preceding

**Conus crepusculum** *Con testâ turbinatâ, tenuicula, supernè lævi, infrà exiliter granulata, granulis seriatim digestis, basim versus gradatim majoribus, luteolâ, basi violacea, spira convexâ apice mucronato, elato, anfractuum marginibus subtilissime obsolete nodulosis*

Conch Icon *Conus*, pl 45 f 251

*Hab* —— ?

This shell is allied in some measure to the *Conus lividus*, it is, however of much lighter growth, there is no indication of any colour in the aperture and the spire is obsoletely very finely beaded

**Conus tristis** *Con testâ turbinata, subfusiformi lævigatâ basim versus sulcata, albâ, spirâ convexo-elatâ, spiraliter striatâ anfractuum marginibus subtilissime nodulosis, anfractûs ultimi nodulis obsoletis, apice mucronato*

Conch Icon *Conus*, pl 45 f 252

*Hab* —— ?

There is no indication of any colour in this shell, it is of rather light structure

**Conus plumbeus** *Con testâ turbinatâ, subpyriformi, irregulariter rugulosâ et granosâ, cæruleo-albâ olivaceo- aut violaceo plumbeo fasciatâ et strigatâ, spirâ convexâ, nodulis subtilibus coronatâ, albâ, apice obtuso, rosaceo, basi et aperturæ fauce vividè violaceâ*

Conch Icon, *Conus*, pl 46 f 253

*Hab* —— ?

The wrinkles and irregular granules which cover the greater portion of this specimen may not belong to the species which is introduced upon independent grounds, namely, on account of the cross-blotched style of painting characteristically exhibited on the under side of the shell, the deep violet lining of the aperture, and the rose tinted apex upon a neatly coronated white spire

**Conus Broderipii** *Con testâ tenuiculâ, subinflatâ, transversim sulcatâ, sulcis basim versus distinctioribus, subtilissimè pertusis, pallidissimè incarnato-albâ, maculis aurantio fuscescentibus inter sulcos ornatâ, spirâ planiusculâ, spiraliter sulcatâ, apice elato, mucronato, basi et aperturæ fauce pallidè incarnato roseâ*

Conch Icon, *Conus*, pl 46 f 254

*Hab* —— ?

I have much pleasure in dedicating this very chaste and beautiful species to W J Broderip, Esq, F R S, a gentleman well known in the conchological world, to whose zeal the country is much indebted for this and many other valuable shells which adorn our national collection

CONUS LAUTUS *Con testa turbinatâ, tenuiculâ, lævigatâ, luteâ, punctis grandibus fuscis, trifasciatim confusis, seriatim cincta, spirâ obtuso-convexâ, strigis fuscis arcuatis ornatâ*

Conch Icon, *Conus*, pl 46 f 255

*Hab* —— ?

I am unable to connect this with any hitherto described species, it exhibits a bright display of colour, and must be a striking shell in finer condition

CONUS ÆMULUS *Con testâ turbinatâ, supernè tumidiusculâ, lævigatâ, olivaceo cæruleâ, olivaceo-fusco variegatâ tæniatâ, et maculatâ, spirâ subobtuso-elatâ, suturis rudibus, aperturæ fauce olivaceo-fusco tincta*

Conch Icon, *Conus*, pl 46 f 256

*Hab* —— ?

This is another very richly coloured shell allied in some measure to the *Conus Guinaicus*, but presenting a very different style of painting

CONUS GRAYI *Con testâ turbinatâ, supernè obesâ, subpyriformi, solidâ, lævigatâ, basim versus lirata, cæsiâ, aut cinereo cæruleâ, maculis grandibus nigricantibus undatis sæpissimè bifasciatim digestis, ornatâ, spirâ convexâ, apice mucronato*

Conch Icon, *Conus*, pl 46 f 258

*Hab* —— ?

As our national Museum is indebted to Mr Gray for this very interesting new species, I have much pleasure in naming it after him

CONUS MINUTUS *Con testâ oblongo-turbinatâ, pyramidali, lævigatâ, incarnatâ, fasciis duabus rubidis latissimis cinctâ, spirâ elatâ, anfractuum marginibus rubido-fusco maculatis*

Conch Icon, *Conus*, pl 47 f 259

*Hab* Island of St Vincent, West Indies, Guilding

This is the smallest species of the genus, and quite peculiar in its characters

CONUS PYGMÆUS *Con testâ subabbreviato-turbinatâ, lævi, infernè sulcatâ, sulcis prominentibus, subdistantibus, pallidè violaceo-albâ, strigis fuscis longitudinalibus, latis, undatis, punctorumque seriebus transversis ornatâ, spirâ quasi gradatim elatâ, lævi, aperturæ fauce rubido-violaceâ*

Conch Icon, *Conus*, pl 47 f 260

*Hab* —— ?

The dark zigzag streaks in this little shell pass over the edges of the whorls, leaving their ends visible on the spire

CONUS CONSPERSUS *Con testâ turbinatâ, leviter inflatâ, lævi, basim versus sulcatâ, pallidè luteolâ, maculis aurantio-fuscis variisque*

*irregulariter conspersis, lineis capillaribus confertis, undique cinctâ, spirâ convexâ, aurantio-fusco maculatâ*

Conch Icon, *Conus*, pl 47 f 262

*Hab* ——?

This species may be recognized by the fine hair lines with which its entire surface is ornamented

Conus attenuatus *Con testâ gracilè turbinatâ, basim versus attenuatâ, lævi, luteâ vel aurantio-fuscescente, strigis albidis perpaucis latis undatis longitudinaliter ornatâ, spirâ depressâ, acutangulâ, aurantio-fuscescente alboque tessellatâ, apice acutissimo elato.*

Conch Icon, *Conus*, pl 47 f 263

*Hab* ——?

The long, slender sugar-loaf form of this shell is rather peculiar and it exhibits a style of painting which I do not remember to have observed in varieties of any other species

Conus buxeus *Con testâ elongato-turbinatâ subcylindraceâ lævi basim versus subtiliter liratâ, luteo-fuscescente, filis fusco punctatis numerosis, confertis, cinctâ, spirâ elatâ, anfractuum marginibus subtilissimè nodulosis, apice mucronato*

Conch Icon, *Conus*, pl 47 f 265

*Hab* ——?

The *Conus buxeus* is very closely allied to the *Conus lignarius*, it differs chiefly in being of a more elongated or fusiform shape, whilst the spire is distinctly beaded and not canaliculated

Conus nitidus *Con testâ turbinatâ, lævi nitida prope basim subtilissime liratâ, aurantio-fuscescente, superne et medianè exiliter albimaculatâ lineis fuscis interruptis subdistantibus undique cinctâ, spirâ subelatâ, spiraliter striatâ, apice pallidè rosaceo*

Conch Icon, *Conus*, pl 47 f 266

*Hab* ——?

The lines which encircle the entire surface of this delicate little Cone are more particularly interrupted in passing over the faint spots round the middle and upper part of the shell The pink apex is very characteristic

Conus castus *Con testâ turbinatâ, subinflatâ, lævi, luteâ, lineis perpaucis exilibus, subtilissimè nigricante-punctatis, irregulariter distantibus, cinctâ, spirâ lævi, apice rosaceo*

Conch Icon, *Conus*, pl 47 f 267

*Hab* ——?

This is another very chaste and characteristic species, allied to the *Conus daucus*

Conus liratus. *Con testâ subabbreviato turbinatâ, liris subprominulis undique circumdatâ, albidâ, maculis paucis aurantio fuscis longitudinaliter confluentibus biseriatim cinctâ, spirâ exsertâ, noduliferâ, apice pallide rosaceo, basi et aperturæ fauce vivide violaceo roseâ*

Conch Icon, *Conus*, pl 47 f 268

*Hab* ——?

A very curious well-marked species, in excellent condition, which, I believe, is at present unique in the unrivalled Cone-collection of the Rev F J Stainforth

## LINNÆAN SOCIETY

May 7, 1844 —E Forster, Esq , V P , in the Chair

M Louis Agassiz, Professor of Natural History at Neufchatel and Dr M J Schleiden, Professor of Botany in the University of Jena, were elected Foreign Members

Read "Descriptions of the Insects collected by Capt P P King R N , F R S F L S &c in the Survey of the Straits of Magellan" By John Curtis Esq , F L S &c , in continuation of a paper printed in vol xviii of the Transactions of the Society

The present paper, like the former, is devoted to *Coleoptera*, and the following are the new genera and species characterized in it —

### Fam HISTERIDÆ

*Hister Mathewsii*, violaceo ater, capite thoracis margine elytrisque punctulatis nisi in elytrorum disco ubi maculæ 2 magnæ violaceæ striæque tres basales breves Long 1¾ lin , lat 1¼

*Hister furcatus*, nitidè virescenti niger, thoracis lateribus brevi-canaliculatis punctulatis, elytris striâ suturali curvatâ basali tribusque costam versus apicem haud attingentibus Long 1⅔ lin , lat 1½

*Hister castaneus*, lævis niger, thoracis lateribus punctulatis, elytris pedibusque castaneis, illis striâ suturali furcatâ duabus aliis æquilongis alterâque humerali breviore Long 1⅔ lin , lat 1¼

### Fam HYDROPHILIDÆ

*Hydrophilus chalybeatus*, intensè nitidè cœruleus, elytris lineis tribus punctulorum remotorum piliferorum, palpis antennisque ochreis apice nigris, pedibus subcastaneis, femoribus piceis Long 6 lin , lat 3

*Hydrophilus ochripes*, palpis antennis labroque basi ochreis apice nigrescentibus, pedibus thoracis margine inferiore sternoque ferrugineo ochraceis Long 4 lin , lat 2¼

### Fam SCARABÆIDÆ

### Sect COPROPHAGA

*Copris semisquamosa*, nigra, clypeo magno bidentato cornu brevi emarginato armato, thorace brevi anticè irregulariter truncato, elytris profundè striatis Long 10½ lin , lat 6

*Copris punctatissima*, nigra, clypeo emarginato haud tuberculato, thorace magno punctatissimo tuberculato parvo anticè armato, elytris profundè punctato-striatis Long 8 lin , lat 1¾

### Sect GEOTRUPIDÆ vel ARENICOLÆ

*Acanthocerus muricatus*, niger, punctulatus, elytris punctato striatis apice tuberculatis Long 1¾ lin , lat 1¼

Sphærosomus muricatus, *Kirby MSS*

### Sect TROGIDÆ

*Trox bullatus*, niger cinereo mixtus, thorace inæquali angulis posticis sublobatis, elytris tuberculis minutis conspersis lineisque tuberculorum magnorum tribus parvorumque pluribus notatis Long 7¼ lin , lat 5

*Trox lachrymosus*, cinereus nigro mixtus, thorace parvo inæquali, elytris amplis elongato-ovatis punctato-striatis lineis tuberculorum magnorum 4 parvorum 5 notatis Long 5—6 lin , lat 3—4

*Trox trisulcatus*, cinerascenti-niger, capite lævi, thoracis sulcis 3 latis longitudinalibus, elytris striatis intervallis fasciculatis Long 2½—3 lin , lat 1⅓—1½

### Sect SCARABÆIDÆ vel XYLOPHILÆ

*Oryctomorphus pictus* (Waterh ), piceus, clypeo bidentato, fronte tuberculato, thorace impressione centrali, elytrorum areâ scutellum cingente strigâque in singulo obliquâ undulatâ nitidè ferrugineis Long 10 lin , lat ultra 5

### Sect PHYLLOPHAGÆ

### Gen TRIBOSTETHES, *Curt*

Palpi iis *Brachystemi* similes, nisi quod maxillares longiores, labiales breves , illorum articulus basalis minutus, 2dus 3tiusque obovato-truncati, hoc breviore, 4tus longus, gracilis, fusiformis, extus sulco longo exaratus Antennæ 10-articulatæ , articulus basalis crassus, clavatus , 2dus parvus subglobosus , 3tius ellipticus , tres sequentes oblongi , 7mus cuneiformis , reliqui clavam ellipticam capitis longitudine efformantes Clypeus integer rotundatus, margine paulùm elevato, suturâ transversali inconspicuâ Thorax parvus, transversus , scutellum mediocre, cordatum Elytra thorace latiora, elliptica Alæ amplæ Pectus villosissimus, sterno haud producto , pygidio nudo Pedes longiusculi, haud crassi , tibiæ anteriores angustæ, extus tridentatæ, reliquæ setosæ suturis ordinariis , tarsi graciles, articulis omnibus subclavatis , ungue simplici

*Tribostethes castaneus*, pallidè castaneus, capite thoraceque virescenti vel æneo tinctis Long 8 lin , lat 4

Brachygaster castaneus, *Laporte*, *Cours Compl d Hist Nat*

### Gen CALLICHLORIS, *Dejean*

Palporum maxillarium articulus penultimus minutus, subglobosus , terminalis crassior, longior, subfusiformis, extùs planus Antennæ 10-articulatæ , articulus basalis crassus, pyriformis , 2dus subglobosus , 3tius 4tusque oblongi , 5tus brevis , 6tus cyathiformis , 7mus cuneiformis , reliqui clavam gracilem fusiformem efformantes Labium transversum, medio paulùm angulatum Clypeus transversè ovalis, medio fortiter reflexo Femora gracilia tibiæ anticæ versus apicem angustatæ, extus tridentatæ , reliquæ subscabriæ, apice pectinatæ, calcaribusque 2 brevibus armatæ tarsi anteriores articulis 4 basalibus brevibus, 3tio 4toque cyathiformibus , omnium 5to intus emarginato , ungue longo, gracili, simplici, anteriore maximè inæquali Sternum haud productum

*Callichloris perelegans*, nitidè flavo-virens punctatissimus, elytris punctato-striatis, subtus pygidioque ferrugineis antice pilis albidis villosis posticè pubescentiâ concolori vestitis Long 7 lin , lat 4

*Leucothyreus? spurius*, sine nitore fulvus, capite thoraceque minutè punctulatis hujus angulis posticis acutis, elytris singulis paribus 4 striarum inconspicuarum notatis Long 8½ lin , lat 5

*Leucothyreus? antennatus*, ochreus, capite castaneo, antennarum clavâ longissimâ Long 6 lin , lat 3

### Gen SERICOIDES, *Guér* Camptorhina, *Kirby nec Schonh*

Antennæ 9-articulatæ , articulus basalis crassus, pyriformis , 2dus obóvatus, 3tius longior, gracilior, 4tus gracilis haud 2do longior, reliqui clavam gracilem, tenuiter 5-lamellatam, efformantes. Clypeus rotundatus Labrum emarginatum Palpi maxillares longi, graciles, 4?-articulati, articulo basali minuto, sequentibus elongatis subæqualibus, terminali truncato labiales 3 articulati, articulo tertio fusiformi Caput semiorbiculare Thorax transversus, basi supra scutellum elongatum emarginatus Elytra longissima Pedes longi, graciles tibiæ anticæ breves, latæ, extùs tridentatæ, reliquæ spinosæ tarsi similes, longissimi, graciles, setosi, articulis subæqualibus ungues omnes simplices, longi, gracíles

*Serioides atricapillus*, elongatus, violaceo brunneus, punctulatus, elytris rugosis lineatis Long 6 lin , lat. 3

Camptorhina atricapilla, *Kirby*

Serioides Reichii, *Guér Rev Zool* 1839, p 301?

### Gen ATHLIA, *Erichs*

Palpi maxillares parvi, sétosi, 4 articulati, articulo basali minuto, 2do elongato-clavato, 3tio obovato-truncato, 4to longitudine primi sub securiformi Antennæ minimæ, 9-articulatæ, articulo basali crasso, clavato, 2do 3tioque obovatis, illo crassiore, 4to brevi, 5to 6toque cyathiformibus, reliquis clavam minutam, lobis crassis cyathiformibus, efformantibus Clypeus reflexus, anticè paulùm angustatus, utrinque emarginatus Caput latiusculum Thorax transversus, convexus, lateribus convexis, basi parum sinuatus, angulis anticis magis acuminatis scutellum parvum ovatum Elytra thorace multò latiora terque longiora, abdomen operientia, posticè latiora rotundata Alæ amplæ Pedes longi, haud graciles tibiæ anteriores profundè emarginatæ tridentatæ, reliquæ setosæ tarsi longissimi, subtus pubescentes, anteriores crassiores ungues omnium bifidi

*Athlia rustica* (Erichs ), castaneus, punctulatus, pubescens, elytris singulis striis 4 elevatis, antennis pedibusque pallidè ferrugineis Long 6½ lin , lat 3

### Gen PACUVIA, *Curt*

Palpi labiales minutissimi maxillares graciles, 4-articulati, articulo basali minuto, 2do 3tioque ovalibus, 4to multo crassiore, parvo, ovato-lanceolato Antennæ parvæ, 9-articulatæ, articulus basalis crassus, clavatus, 2dus magnus, globosus, tres sequentes minores, subglobosi, 5tus subcyathiformis, 6tus cuneiformis, reliqui clavam ovalem efformantes Caput trigono-truncatum Clypeus reflexus, emarginatus Thorax transversus, subhexagonus, lateribus prominentibus Scutellum elongato-trigonum Elytra thorace latiora, terque longiora, elliptica Alæ amplæ, Pygidium nudum Pedes longi, extensi femora anteriora brevissima, postica crassissima tibiæ anteriores breves, extus bispinosæ, reliquæ pilosæ, medio spinosæ tarsi longissimi, subtùs pubescentes, 4 anteriorum articulo 2do 3tioque dilatatis, omnium articulo basali 2do multo breviore, terminali gracillimo unguibus longis, gracilibus, bifidis

*Pacuvia castanea*, ochrea punctulata, capite thoraceque castaneis, elytris singulis striis 4 duplicatis Long 4½ lin , lat 2½

### Gen ACCIA, *Curt*

Palpi nudi labiales minutissimi, maxillares parvi, 4-articulati, articulo basali minuto, 2do elongato, clavato, 3tio breviori, obovato, 4to omnium maximo, elliptico-truncato Antennæ parvæ, 9-articulatæ, articuli 2 basales crassi, 1mo pyriformi, 2do globoso-pyriformi, 3tius gracilis, longus, 4tus ovalis, 5tus 6tusque annuliformes, reliqui clavam tenuem efformantes Clypeus rotundatus reflexus Caput mediocre Thorax transversus, basi sinuatus, margine anteriore excavatus, angulis prominentibus Scutellum elongato-trigonum Elytra thorace ferè quater longiora, elliptica, pygidium haud completè operientia Alæ amplæ Pedes longi, graciles femora tibiæque anteriores brevissimæ, hæ latæ, extùs tridentatæ, 4 posteriores spinosæ tarsi longi, graciles, setosi, haud subtùs pubescentes, articulo basali longitudine 2di unguibus gracilibus, simplicibus

*Accia lucida*, nitidè testacea minutè punctulata, capite ferrugineo, elytris subcupreis striatis Long 4½ lin , lat 2

*Colporhina bifoveolata*, ferruginea æneo tincta punctulata, squamis albidis in thorace elytrisque maculas efformantibus vestita Long 3 lin , lat. 1⅔

*Macrodactylus marmoratus*, subcastaneus pilis albidis vestitus, thoracis disco brunneo lineâ pilorum albidorum centrali, elytris fasciis irregularibus brunneis pubescentiæque albidæ maculis notatis Long 3¼ lin , lat 1½

### Fam Lucanidæ

*Dorcas rufifemoralis*, cinereo-niger, capite thoraceque nitidis, elytris densè profundèque punctulatis punctis ochreo papillatis, coxis femoribusque rufis Long ♂ 10, ♀ 7½ lin , lat ♂ 3½, ♀ 3

Dorcas rufifemoralis, *Guér* ?

## HETEROMERA

### MELASOMA

### Fam Pimeliaridæ

*Procris lævicosta*, obscurè æneo-nigra, elytrorum margine inferiore haud punctulato, tarsis subferrugineis Long 4½ lin , lat 2¾

### Fam Blapsidæ

*Scotobius bullatus*, obscurè niger rugosus latus brevis, capite thoraceque punctatissimis hujus angulis posticis acutis, elytris punctato-striatis porcis in intervallis nitidis granulatis ad apicem tubercula distincta efformantibus seriebus 2 costalibus remotè tuberculatis Long 6½ lin , lat 3⅓

*Leptynoderus tuberculatus*, lutosus, capite trituberculato, thorace tuberculato, elytris porcis 5 acutis e quibus 2 dorsalibus fortioribus Long ferè 6 lin , lat 2½

*Emalodera multipunctata*, nitide nigra punctatissima, thorace obovato truncato, elytrorum punctis lineas numerosas duplicatas efformantibus margine extus apiceque tuberculatis Long 5½—6½ lin , lat 3—3⅓

*Nyctelia caudata*, nitidè atra, elytris (nisi in areâ suturali) oblique crasseque sulcatis apice in caudam semicircularem dilatatis Long 8½—13 lin , lat 5—7½

*Nyctelia undatipennis*, lævis nigra, elytris sulcis 7 brevibus latis transversis in margine exteriore Long 8 lin , lat ♂ 4⅓, ♀ 5⅓

*Nyctelia Fitzroyi*, lævis nigra, elytris hemisphæricis caudatis, antennis pedibusque nitide ferrugineis Long 10 lin lat 7½

*Nyctelia granulata*, lævis nigra, elytris latissimis ovatis orbicularibusve rugosissimis rugis suturam versus lineas longitudinales efformantibus Long ♂ 8 lin , ♀ 9, lat 4½—6

*Nyctelia Bremii*, nitidè nigra, elytris suborbicularibus caudatis lineis elevatis suturam versus obliquis ad marginem exteriorem curvatis profundè insculptis Long 9 lin , lat 5½

Nyctelia Bremii, *Waterh in Ann and Mag Nat Hist* vol xiii p 48

*Nyctelia ? corrugata*, nitidè nigra, thoracis lateribus rugosis, elytris transversim undulato-canaliculatis suturâ depressâ bistriatâ. Long 8½ lin , lat 5

*Mitragenius araneiformis*, niger, thorace subtilissimè vermiculato prope basin angulato, elytris cinereis cupreo tinctis subscabris nigro maculatis singulis porcis 2 ante apicem coalitis Long 8¼—9 lin , lat 4½—5½

*Epipedonota margineplicata*, nigra nitida, thorace concavo in disco longitudinaliter in marginibus transversè striato, elytris porcis 2 exteriore fortiore intervallo hanc inter marginemque exteriorem regulariter transversè canaliculato Long 11 lin , lat 6

*Nycterinus rugiceps*, obscurè niger, capite punctulato ad basin granulato, thorace lævi, elytris punctato-striatis Long 8 lin , lat 3

### Taxicornes

### Fam Diaperidæ

*Oplocephala quadrituberculata*, piceo-nitida, trophis antennis pedibus subtùsque ferrugineis, capite 4-tuberculato Long 3¼ lin , lat 1½

*Alphitobius? punctatus*, ellipticus subconvexus, virescenti-niger, punctatissimus, elytris piceo-brunneis striato-punctatis, trophis antennis pedibusque castaneis Long 2 lin , lat 1

*Epilasium rotundatum* (Dej ), ovale, nigrum, punctatissimum, pube pallidè brunneâ vestitum, elytris punctato-striatis Long 4 lin , lat 2⅔

### Fam Tenebrionidæ

*Epitragus æneo-brunneus*, ferrugineus æneo tinctus, undique punctatus, capite punctatissimo, elytris minute striato punctatis Long lin 4 , lat 1¾

*Epitragus semicastaneus*, castaneus, minute punctatissimus, capite thoraceque piceis, elytris inconspicue punctato striatis Long 3½ lin , lat 1⅔

### Fam Hllopidæ

*Prostenus? hirsutus*, nitide æneus vel cupreus, pilis longis vestitus, punctulatus, antennis nigris, elytris subcastaneis punctato-striatis, femoribus basi rufis Long 2½ lin , lat 1⅓

### Fam Mordellidæ

*Mordella Tachyporiformis*, nigra minutè et crebrè punctulata, suprà pube brevi brunneâ vestita Long 3 lin , lat ultra 1

*Mordella argentipunctata*, sericeo-nigra, thoracis margine antico elytrorumque basali maculis 4 aculeisque basalibus argenteo-albis Long ferè 2 lin , lat ¾

### Fam Cantharidæ

*Epicauta conspersa* (Germ ?), nigra pube cinereâ, punctis nigris minutis sparsim conspersa Long 5 lin , lat 2

*Tetraonyx 7-guttatus*, niger suprà aurantiacus, capitis thoracisque maculâ elytrorum maculis 4 basalibus fasciâque postmedianâ irregulari nigris, femoribus basi rufis Long 5½ lin , lat 2¼

*Tetraonyx cinctus*, nitidè niger pubescens punctulatus, elytris subscabris suturâ margineque exteriore ochraceis Long 4 lin , lat 1½

### Fam Œdemeridæ

*Nacerdes? alternans*, pallidè ochreus, oculis thoracis lineâ inconspicuâ elytrorumque strigis 2 longis pallidè fuscis Long 3¾ lin , lat 1

**The paper was accompanied by drawings of many of the new species**

## BOTANICAL SOCIETY OF EDINBURGH

This Society met on Thursday, June 13th, at the Royal Botanic Gardens, Professor Graham, President, in the chair

1 "On four genera of *Desmidieæ*," by Mr John Ralfs, Penzance The genera are *Cosmarium*, *Pediastrum*, *Xanthidium* and *Scenedesmus*, and the descriptions of them, which were accompanied by illustrative drawings, will shortly appear in the 'Annals and Magazine of Natural History'

2 "Continuation of Mr James M'Nab's Journal of a Tour through part of the United States and the Canadas" In the previous part of this Journal Mr M'Nab gave a brief outline of the principal botanical and horticultural features observed in the neighbourhood of New York The part now read embraced chiefly the appearance of the country around Albany, with an account of the most interesting plants seen during the journey thither Among these the most remarkable were several species of *Lycopodium* with which the peaty soils on the road-sides around Albany were covered, consisting of *L complanatum clavatum* and *dendroides*, the latter resembling at a distance young spruce firs, being similarly shaped and of a lively green colour In damp situations in the close forests, *Adiantum pedatum* and other ferns covered large tracts, while *Pyrola elliptica* and *rotundifolia*, with *Chemophylla maculata* and *umbellata*, were in full flower along the drier parts *Satyrium herbiola* and *Neottia tortilis* were also observed the latter growing chiefly in pairs The principal plants noticed in the meadows or open grounds were *Lilium philadelphicum* and *canadense*, *Mimulus ringens Verbena hastata* and *urticifolia*, and *Asclepias obtusifolia* and *variegata* Proceeding towards Troy on the banks of the Hudson, great quantities of *Kalmia angustifolia Cornus florida*, *Lupinus perennis* Andromedas, Vacciniums, &c occurred In an extensive forest, chiefly composed of small trees and much entangled with *Smilax* or green brier, through which the party proceeded with great difficulty, *Cypripedium spectabile* covered large patches with *Arum triphyllum*, the latter in full flower Mr M'Nab concluded the present part of his Journal with an account of some large trees of the hemlock spruce *Abies canadensis*, being the first of this tree which the party had observed in natural situations, the largest specimens were about 10 feet in circumference and 80 feet in height

This Society held its last meeting for the session on Thursday July 11th, at the Royal Botanic Garden, Professor Graham in the chair

The Treasurer read a paper on three genera of *Desmidieæ*, by Mr John Ralfs, Penzance, viz *Desmidium*, *Glæoprium*, and *Schistochilum*

Mr James M'Nab read a portion of his Journal of a Tour in the United States and Canadas In the last notice Mr M'Nab gave an account of the excursion from Albany to Troy, and thence to Stillwater, with notices of the most interesting plants observed during the journey thither, the present portion is chiefly confined to observations on the botany of the same district —July 15 In the early part of the day a severe thunder-storm, accompanied with much rain, prevented the party from going abroad, but afforded an opportunity for arranging the specimens already collected The storm having abated towards the afternoon, they were enabled to make a short excursion along the banks of the Hudson, few species, however, rewarded their exertions, the greater portion being out of flower, of those gathered, the most attractive were *Lobelia cardinalis* and *Habenaria fimbriata*, both in great abundance, the rich spikes of scarlet flowers of the former being admirably contrasted with the delicate purple blossoms of the latter, these two species formed the bulk of the flowering plants mixed with them, but more sparingly *Habenaria lacera* and *Neottia cernua* occurred, with *Apocymum androsæmifolium*, the latter being the most abundant, and covered with a beautiful coleopterous insect, which appeared to be peculiar to it On the sloping banks of the river, in thickets of shumacs, hazels, willows, &c, a gigantic species of Solomon s seal, *Polygonatum latifolium*, was observed, some of the specimens measured seven feet nine inches in height, with roots four inches in circumference In several places the ground was so matted over with the stems of the poison oak, *Rhus toxicodendron*, that the hands of the party were much blistered in endeavouring to extricate themselves —July 16 Having procured a canoe, the party proceeded about two miles down the river during this short voyage they observed vast quantities of the shells of the freshwater mussel, covering the little sandy hills by the river's edge which had been collected by the musk rats with which the banks everywhere abound At this place the rapidity of the stream, which had hitherto prevented the growth of aquatic plants, became much diminished, and they now observed large portions of its surface covered with *Nuphar Kalmiana* and *advena* together with *Nymphæa rosea*, all beautifully in flower, and growing from a depth of eight feet Overhanging the banks on both sides of the river, *Salix petiolaris* was in fine condition, its broad lunate stipules adding much to the beauty and singularity of its appearance, here also some fine specimens of the Virginian poplar, *Populus monilifera*, were seen, the largest stems measured were nine foot in circumference and about seventy foot in height

Leaving Stillwater the party proceeded by canal to Whitehall, on the banks of the canal, and extending over the neglected fields, such quantities of the great mullein, *Verbascum Thapsus*, were observed, as to give the idea of its having been sown for a crop, the fact of its growing on the soil which had recently been thrown out of the canal as well as on the sloping banks, convinced them that the seed must have lain buried in the earth, probably for a long series of years, and that therefore it is not likely, as has been generally supposed, that this plant has been introduced by the emigrants, but rather that it is indigenous to the country The common St John's wort, *Hypericum perforatum*, was also extremely abundant in this district, although sparingly seen before, and is described by Mr M'Nab as one of the greatest evils the American farmer has to contend with, being supposed to be highly injurious to cattle, especially horses, causing blindness, which prevailed in many parts to a fearful extent

On reaching Whitehall, situated at the southern extremity of Lake Champlain two remarkable species of ferns were observed for the first time, namely *Asplenium rhizophyllum* and *Aspidium bulbiferum*, the former growing on the surfaces of moist rocks, where it throws out its fronds which take root at their extremities, while the latter bears a number of small bulbs along the rachis, which, when mature, fall off and vegetate in the crevices of the rocks Many other interesting plants were observed, but few of them in flower with the exception of *Rubus spectabilis*, *Desmodium acuminatum* and *canadense*, and a few others

Mr M'Nab afterwards exhibited several specimens of gooseberries and currants which had been kept for the last two years in glasses containing water only, in which they had now matured their fruit for the second time, and it was remarkable that the gooseberries (*yellow amber*) and the red and white currants were as highly flavoured as the same sorts under ordinary treatment

Mr Trevelyan exhibited specimens of some remarkable varieties of *Taraxacum officinale* found on the sandy beach near Arbroath, and a curious variety of *Aspidium, felix fœmina*, from Braemar, having the frond branched at the extremity, the specimens were afterwards presented to the Society

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## MISCELLANEOUS

### *Correction by* Dr Dickie *on* Art XXI p 168 *of this Number*

### CUTLERIA MULTIFIDA

In justice to so accurate an observer as Dr Greville, I beg to acknowledge that since my note and figures on the fructification of this genus were made out, I have ascertained that they have reference to its condition when immature —G D

### COLOURING OF THE WATERS OF THE RED SEA

A memoir on the colour of the waters of the Red Sea, by M Montagne, was read at the Académie des Sciences, July 15th The conclusions which the author draws from all the facts contained in his memoir, whether already known or entirely new and still unpublished, are the following —

1 That the name of Erythrean Sea, given first to the sea of Oman and to the Arabian Gulf by Herodotus, afterwards by the later Greek authors to all the seas which bathe the coasts of Arabia, probably owes its origin to the very remarkable phænomenon of the colouring of its waters

2 That this phænomenon, observed for the first time in 1823 by M Ehrenberg in the bay of Tor only, then again seen twenty years later by M Dupont, but in truly gigantic dimensions, is owing to the presence of a microscopic Alga *sui generis*, floating at the surface

of the sea, and even less remarkable for its beautiful red colour than for its prodigious fecundity.

3. That the reddening of the waters of the lake of Morat by an *Oscillatoria* which DeCandolle has described, has the nearest relation to that of the Arabian Gulf, although the two plants are generically very distinct.

4. That as we may well suppose, according to the accounts of navigators, who mention striking instances of the red colouring of the sea, these curious phænomena, though not observed till quite recently, have nevertheless without doubt always existed.

5. That this unusual colouring of seas is not exclusively caused, as Peron and some others seem to think, perhaps as being chiefly zoologists, by the presence of mollusca and microscopic animalcules, but that it is often also due to the reproduction, perhaps periodical and always very prolific, of some inferior Algæ, and in particular of the species of the singular genus *Trichodesmium*.

6. Lastly, that the phænomenon in question, although generally confined between the tropics, is however not limited to the Red Sea nor indeed to the gulf of Oman, but that, being much more general, it is found in other seas, for example in the Atlantic and Pacific Oceans, as appears in the 'Journal of Researches' by Mr. Darwin, and from the unpublished documents of Dr. Hinds, communicated by Mr. Berkeley, and from which the following extract is given:—

"Dr. Hinds, who sailed in the ship Sulphur, sent to explore the western coasts of North America, first observed on the 11th of February 1836, near the Abrolhos Islands, the same Alga doubtless which Mr. Darwin saw at the same date. This Alga was again seen many days running. Some specimens of it having been brought to Dr. Hinds, he perceived that a penetrating odour escaped from it which had before been thought to come from the ship: this odour much resembled that which exhales from damp hay. In April 1837, the Sulphur being at anchor at Libertad, near St. Salvador, in the Pacific, Dr. Hinds again saw the same Alga.

A land breeze drove it for three days in very thick masses about the ship. The sea exhibited the same aspect as at the Abrolhos Islands, but the smell was still more penetrating and disagreeable; it caused in a great many persons an irritation of the conjunctive, followed by an abundant secretion of tears. Dr. Hinds himself experienced it. The Alga in question constitutes a distinct species of the genus *Trichodesmium*, and is named by M. Montagne *T. Hindsii*. It differs from that of the Red Sea both in dimensions and smell."—*Comptes Rendus*, July 15, 1844.

### M. DE QUATREFAGES ON GASTEROPOD MOLLUSCA.

M. de Quatrefages, at present engaged in the pursuits of natural history on the coasts of Sicily in company with M. Milne Edwards, has sent to the Academy of Sciences a notice on the group of Gasteropod Mollusca for which he has proposed the name of *Phlebenterata*, and of which the following is an abstract.

1. In all the Phlebenterate Gasteropod Mollusca, the function of

digestion is confounded, so to speak, with those of respiration and circulation It is this that constitutes the dominant character of the group

2 This kind of fusion occasions the disappearance of the organs of respiration properly so called No Phlebenterate has branchiæ in the ordinary sense of the word

3 Through the same cause the apparatus of circulation is progressively simplified until its complete annihilation No Phlebenterate possesses veins, the arteries and the heart itself disappear in the greater number When they exist, they are nothing more than organs fitted to agitate and mix the blood They have no other functions than the dorsal vessel of insects

4 In the Enterobranchiata the division of the digestive apparatus brings with it the subdivision of the liver In the Dermobranchiata this gland only forms a portion of the partitions of the gastro-vascular abdominal pouches In no Phlebenterate does the liver exist as a distinct organ In the grouping of the Mollusca this anatomical character belongs as yet exclusively to the group of which we are speaking

5 The reproductive apparatus is always asymmetric in the Phlebenterata Nearly with this exception the organs both internal and external exhibit a binary lateral symmetry which would be complete, did not the anus sometimes swerve to the right of the medial line Such of these mollusks as possess multiple exterior organs tend moreover, to repeat them in a longitudinal series By these two tendencies the Phlebenterata approach the type of the annulated animals —*Comptes Rendus*, July 15th, 1844

### *Of the Sexes in* Holothuria, Asterias, *and* Planaria —*Nervous System of* Planariæ

In a second note, M de Quatrefages states that by the aid of the microscope he has determined with the most positive certainty, that in *Holothuria tubulosa* and *Asterias rubra* the sexes are separate In each, the testicles are quite like ovaries in form and position, the nature of the products alone can enable them to be distinguished He has made similar observations on the *Actinia viridis* With regard to this latter species, he points out that he could not confound the spermatozoids with the urtical organs that clothe the ovary, and which, taken for the fecundating element by some naturalists, caused them to regard the *Actiniæ* as hermaphrodite, for in the *Actinia viridis* the urtical organs have no resemblance whatever to spermatozoids, and are from ten to twelve times of greater diameter

In the *Planariæ*, on the other hand, the sexes are really and perfectly united, as Baer and Dugès have admitted, but neither of them had seen the spermatozoids of those animals M de Quatrefages states that he has found them in several individuals which likewise bore eggs The two before-mentioned naturalists had not found any nervous system in the *Planariæ*, and Dugès seems even much disposed to regard them as possessing none M de Quatrefages has detected the existence of this system in several species, it was apparent with the same characters in all it consists in a double ganglion placed before the buccal orifice from which several threads go off —*Comptes Rendus*, July 15th, 1844

### *On the* Chrysanthemum leucanthemum, *considered as a specific remedy against Fleas* By Prof Cantraine

During my residence in the eastern countries of Europe, I was astonished at the small number of fleas which are to be found, in spite of the extraordinary dirtiness of the dwellings I afterwards learnt at Ragusa, that the Bosnians and Dalmatians had found a remedy against these troublesome blood-suckers in the *Chrysanthemum leucanthemum* They place the plant in the bed of the domestic animals, such as dogs, cats, &c , and the fleas are destroyed in a very short time If this plant possesses the same virtue in our climate, it might become very useful, not only in the houses of the poor, but even in the mansions of the rich In order to put this property to the test, it may be well to direct general attention to this very common and well-known plant, the vulgar name of which is the great *Ganzebloeme* (Goose-flower) known in France as *Fleur de St Jean* (doubtless from its flowering near St John's day) [and in England as the Common Ox-eye] —*Bulletin de l'Acad Royale de Bruxelles*, tom viii part 2 p 234

### ON THE BIRDS OF LINCOLNSHIRE AND THE FENS

From *Drayton s Poly-olbion*, S xxiii , xxv *

From Ely all along upon the eastern sea,
Then Lincolnshire herself in state at length doth lay
Which, for her fatt'ning fens, her fish, and fowl, may have
Pre eminence as she that seemeth to outbrave
All other southern shires
She, by the Muses aid, shall happily reveal
Her sundry sorts of fowl, from whose abundance she
Above all other tracts may boast herself to be
The mistress , and, indeed, to sit without compare
" My various fleets for fowl, O who is he can tell,
The species that in me for multitudes excel !
The Duck[1] and Mallard[1] first, the falconer's only sport,
(Of river-flights the chief, so that all other sort
They only green fowl term,) in every mere abound,
That you would think they sat upon the very ground,

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* We are indebted to Mr Yarrell for the notes which are subjoined —Ed

[1] *Anas Boschas*, female and male The Peregrine Falcon was the species most commonly used for duck hawking, and our wild-duck, from its courage as well as its powers of flight, is almost the only duck that will take the air boldly and ' try conclusions ' with him I have been told by falconers, that if it blows hard, the wild-duck can make its way up wind so fast as to get clear off The Peregrine Falcon is frequently called the Duck-hawk They breed on high rocks near the coast, and subsist almost exclusively on water-fowl

Their numbers being so great, the waters covering quite,
That rais'd, the spacious air is darken'd with their flight,
Yet still the dangerous dykes from shot do them secure,
Where they from flash to flash, like the full epicure
Waft, as they lov'd to change their diet every meal,
And near to them you see the lesser dibbling Teal[2].
In bunches[3], with the first that fly from mere to mere,
As they above the rest were lords of earth and air
The Gossander[4] with them, my goodly fens do show,
His head as ebon black, the rest as white as snow,
With whom the Widgeon[5] goes, the Golden eye[6], the Smeath[7],
And in odd scatter'd pits, the flags and reeds beneath
The Coot[8], bald, else clean black, that whiteness it doth bear
Upon the forehead starr'd, the Water-hen[9] doth wear
Upon her little tail, in one small feather set
The Water-Woosell[10] next all over black as jet,
With various colours, black green blue, red, russet, white
Do yield the gazing eye as variable delight
As do those sundry fowls, whose several plumes they be
The diving Dobchick[11] here amongst the rest you see,
Now up now down again, that hard it is to prove,
Whether under water most it liveth, or above,
With which last little fowl (that water may not lack,
More than the dobchick doth and more doth love the brack[12],)
The Puffin[13] we compare, which coming to the dish,
Nice palates hardly judge if it be flesh or fish[14]
"But wherefore should I stand upon such toys as these,
That have so goodly fowls, the wand'ring eye to please?
Here in my vaster pools, as white as snow or milk,
(In water black as Styx,) swims the Wild Swan[15], the Ilke[15],
Of Hollanders so term'd, no niggard of his breath,
(As poets say of swans who only sing in death,)
But oft as other birds is heard his tunes to roat,
Which like a trumpet comes, from his long arched throat[16],

[2] *Anas Crecca*

[3] The word used in falconry and by fen men for a company of teal

[4] Gossander, for Goosander, *Mergus Merganser*

[5] *Anas Penelope*    [6] *Anas clangula*

[7] Smeath I suppose to have been another name for the Smew, *Mergus albellus*

[8] Coot bald or Bald-coot, *Fulica atra*

[9] Water hen or Moor-hen, *Gallinula chloropus* The specific name refers to the green colour of the legs the under tail coverts are nearly white, as noticed by Drayton

[10] Water Woosell (Water-Ouzel) the Dipper, *Cinclus aquaticus*

[11] Dabchick or Little Grebe, *Podiceps minor*

[12] Salt water    [13] *Fratercula arctica*

[14] Several species of water-fowl, supposed to feed exclusively on fish, are permitted to be eaten by Catholics on their maigre days

[15] Elk and Hooper, names of the wild swan, *Cygnus ferus*

[16] See Dr Latham and Mr Yarrell's papers in the 'Transactions of the Linnæan Society,' vols iv xvi and xvii, on the convoluted wind-pipes of wild-swans

And tow'rds this watery kind, about the flashes brim,
Some cloven-footed are, by nature not to swim
There stalks the stately Crane[17], as tho' he march'd in war,
By him that hath the Hern[18], which (by the fishy car)
Can fetch with their long necks, out of the rush and reed,
Snigs[19], fry, and yellow frogs, whereon they often feed
And under them again (that water never take,
But by some ditches side, or little shallow lake,
Lie dabbling night and day) the palate-pleasing Snite[20],
The Bidcock[21], and like them the Redshank[22], that delight
Together still to be in some small reedy bed,
In which these little fowls in summer s time were bred
The buzzing Bitter[23] sits, which through his hollow bill
A sudden bellowing sends which many times doth fill
The neighbouring marsh with noise, as though a bull did roar
But scarcely have I yet recited half my store,
And with my wondrous flocks of Wild Geese[24] come I then,
Which look as though alone they peopled all the fen,
Which here in winter time when all is overflow'd,
And want of solid sward enforceth them abroad,
Th abundance then is seen that my full fens do yield,
That almost through the isle do pester every field,
The Barnacles[25] with them which wheresoe'er they breed,
On trees, or rotten ships yet to my fens for feed
Continually they come, and chief abode do make
And very hardly forc'd my plenty to forsake,
Who almost all this kind do challenge as mine own,
Whose like, I dare aver, is elsewhere hardly known
For sure, unless in me, no one yet ever saw
The multitudes of fowl in mooting time they draw,
From which to many a one much profit doth accrue
  "Now such as flying feed next these I must pursue
The Sea Meaw[26], Sea Pye[27], Gull[28], and Curlew[29], here do keep,
As searching every shoal, and watching every deep

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[17] *Grus cinerea* [18] *Ardea cinerea* [19] Small eels

[20] Snite or Snipe, *Scolopax gallinago*

[21] Bidcock and Bilcock, old names for the Water rail, *Rallus aquaticus*

[22] *Totanus calidris*

[23] Bitter or Bittern, *Botaurus stellaris* The generic name is derived from *Bos* and *Taurus*, in reference to the bull-like roar

[24] The particular species is doubtful

[25] In reference to the old fable

[26] Sea-mew, Sea mell and Sea-mall, old names for a small common gull Thus Caliban, among his other offers of service to Stephano, says—

"and sometimes I ll get thee
Young sea-mells from the rocks
*Shakespeare's 'Tempest,'* Act 2, Scene 2

[27] Sea pye, a name for the Oyster catcher, *Hæmatopus ostralegus*, in reference to its black and white colours

[28] Already noticed

[29] *Numenius arquata* Both words refer to the bent form of the beak, *numenius* meaning 'new moon'

To find their floating fry, with their sharp piercing sight,
Which suddenly they take by stooping from their height
The Cormorant[30] then comes (by his devouring kind),
Which flying o'er the fen, immediately doth find
The Fleet best stor'd of fish, when from his wings at full,
As though he shot himself into the thicken'd skull[31],
He under water goes, and so the shoal pursues,
Which into creeks do fly, when quickly he doth choose
The fin that likes him best, and rising, flying feeds
The Ospray[32] oft here seen, though seldom here it breeds,
Which over them the fish no sooner do espy,
But (betwixt him and them by an antipathy)
Turning their bellies up, as though their death they saw,
They at his pleasure lie, to stuff his gluttonous maw "

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[30] *Phalacrocorax carbo*

[31] Skull, or scool, a shoal, so, in Cornwall, a scool of pilchards; &c

[32] *Pandion haliaetus*

## METEOROLOGICAL OBSERVATIONS FOR JULY 1844.

*Chiswick* —July 1 Slight haze cloudy thunder, with rain from 6 till 8 P M 2 Rain cloudy 3 Cloudy 4 Slight rain cloudy 5, 6 Fine 7 Hazy and mild overcast 8 Hazy very fine 9—11 Very fine 12 Very fine showery 13 Rain heavy rain at night 14, 15 Clear and fine 16 Overcast 17 Fine dusky clouds hazy 18 Very fine cloudy 19 Overcast thunder quarter to 1 P M thunder showers in afternoon 20, 21 Clear and fine 22 Cloudless and very hot 23, 24 Sultry 25 Very hot 26 Cloudy clear 27 Hot and dry 28 Very fine cloudy 29 Hot and very dry exceedingly clear at night 30 Overcast rain 31 Cloudy and fine clear —Mean temperature of the month 1° above the average

*Boston* —July 1 Fine rain A M 2 Cloudy 3 Fine 4 Fine rain P M 5 Rain 6—8 Cloudy 9—11 Fine 12 Fine rain A M 13 Fine rain A M and P M 14 Stormy 15 Fine rain A M, with thunder 16 Fine rain P M 17 Fine 18 Fine rain P M, with thunder and lightning 19 Fine rain P M 20, 21 Fine 22 Fine thermometer 81° 2 o clock P M 23 Fine thermometer 80° 3 o clock P M, in the sun 112° 24 Cloudy rain A M 25 Fine rain P M 26, 27 Cloudy 28 Fine 29 Fine rain early A M rain P M 30 Cloudy rain P M 31 Cloudy rain, with thunder and lightning A M

*Sandwick Manse, Orkney* —July 1 Cloudy 2—6 Drizzle showers 7—9 Cloudy 10 Cloudy showers 11 Showers cloudy 12 Damp cloudy 13 Bright cloudy 14 Cloudy 15 Cloudy clear 16 Bright clear 17 Clear 18 Clear showers 19 Cloudy showers drizzle 20 Cloudy 21 Cloudy showers 22 Cloudy fine 23 Clear fine 24 Bright cloudy 25 Clear fine 26 Clear fog 27 Clear fine 28 Bright showers fog 29 Drizzle 30 Cloudy 31 Rain

*Applegarth Manse, Dumfries-shire* —July 1 Fine a few drops of rain 2—4 Fine sultry 5 Fine, but cloudy 6 Slight shower 7 Fine and fair 8 Fine a few drops of rain 9 Fine, but cloudy 10 Showers 11 One shower 12 A few drops of rain 13 Heavy rain, 14 Showers thunder 15—17 Showers 18 Showers thunder 19 Slight shower thunder 20 Fair 21 Wet all day 22 Fine 23 One heavy shower thunder 24—26 Rain heavy P M 27 Beautiful day 28 Showers 29 Fair 30, 31 Rain

*Meteorological Observations made by* Mr Thompson *at the Garden of the Horticultural Society at* CHISWICK, *near London, by* Mr Veall, *at* BOSTON, *by the* Rev W Dunbar, *at Applegarth Manse,* DUMFRIES SHIRE, *and by the* Rev C Clouston, *at Sandwick Manse,* ORKNEY

| Days of Month. | Barometer | | | | | | | Thermometer | | | | | | | Wind | | | | Rain | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chiswick. | | Boston 8½ a m | Dumfries-shire | | Orkney Sandwick | | Chiswick | | Boston 8½ a m | Dumfries-shire | | Orkney Sandwick | | Chiswick 1 p m | Boston | Dumfries-shire | Orkney Sandwick | Chiswick | Boston | Dumfries-shire | Orkney Sandwick |
| 1844 July | Max | Min | | 9 a.m | 9 p m | 9½ a m | 8½ p m | Max | Min | | Max | Min | 9½ a m | 8½ p m | | | | | | | | |
| 1 | 29 853 | 29 829 | 29 39 | 29 77 | 29 77 | 29 90 | 29·90 | 79 | 54 | 57 | 67 | 47 | 49½ | 49 | s | calm | se | n | 34 | | | - |
| 2 | 29 841 | 29 832 | 29 37 | 29 80 | 29 80 | 29 91 | 29 91 | 69 | 53 | 60 | 63½ | 49 | 52 | 47 | n | calm | sse. | n | 22 | ·07 | | 13 |
| 3 | 29 876 | 29·809 | 29 43 | 29·79 | 29 73 | 29 90 | 29·90 | 72 | 57 | 62 | 67 | 50 | 48½ | 47½ | se | calm | s | nne. | 14 | | | |
| 4 | 29 638 | 29 596 | 29 19 | 29 69 | 29 67 | 29 84 | 29 78 | 68 | 55 | 63 | 60 | 49 | 52 | 48 | sw | calm | ne | nw | 01 | | | |
| 5 | 29 656 | 29 576 | 29 13 | 29 65 | 29 63 | 29 73 | 29 70 | 70 | 50 | 55 | 64 | 49½ | 49 | 47 | ne | calm | se | n | 06 | ·79 | | |
| 6 | 29 878 | 29 809 | 29 34 | 29 71 | 29 80 | 29 80 | 29·92 | 65 | 54 | 60 | 64 | 53 | 48 | 46 | n | calm | s | nw | 06 | | | 06 |
| ☾ 7 | 29·995 | 29 929 | 29 50 | 29 88 | 29 85 | 29 95 | 29 95 | 68 | 53 | 57 | 67 | 52 | 48½ | 46½ | e | calm | s | nw | 13 | | 0 06 | |
| 8 | 29 931 | 29 856 | 29·47 | 29 84 | 29 78 | 29 88 | 29 84 | 77 | 58 | 55 | 66 | 46 | 55 | 49 | w | sw | w | se. | | | | |
| 9 | 29 906 | 29 850 | 29 34 | 29 76 | 29 81 | 29 87 | 29 87 | 74 | 49 | 64 | 62½ | 49 | 53 | 51½ | n | w | w | w | | | | |
| 10 | 29 967 | 29 880 | 29 44 | 29 81 | 29·66 | 29 76 | 29 62 | 78 | 60 | 65 | 63 | 47 | 59½ | 52 | sw | calm | w | ssw | | | | |
| 11 | 29 880 | 29 864 | 29 29 | 29 67 | 29 65 | 29 44 | 29 54 | 78 | 56 | 64 5 | 63½ | 51 | 52 | 50½ | w | w | sw | w | | | | ·25 |
| 12 | 29 939 | 29 870 | 29·27 | 29 72 | 29 78 | 29 64 | 29 74 | 78 | 56 | 63 | 62 | 50 | 51½ | 48½ | w | w | wnw | wnw | 06 | | | 05 |
| 13 | 29 905 | 29 494 | 29 33 | 29 65 | 29 17 | 29 64 | 29 48 | 71 | 56 | 62 | 58½ | 48 | 56 | 51 | sw | calm | sse | se. | 53 | 08 | | |
| 14 | 29 679 | 29 530 | 28 88 | 29 20 | 29 59 | 29 44 | 29 64 | 75 | 47 | 62 | 62 | 51 | 53 | 49 | w | w | s | n | | 36 | | |
| ● 15 | 29 928 | 29 809 | 29 30 | 29 60 | 29 70 | 29 71 | 29 82 | 76 | 46 | 65 5 | 61 | 42 | 52 | 50 | w | w | sw | nw | | | 1 10 | |
| 16 | 29 994 | 29 949 | 29 47 | 29 82 | 29 89 | 29 87 | 29 93 | 75 | 42 | 62 | 63 | 41½ | 51 | 49 | sw | calm | w sw | | | 16 | | |
| 17 | 30 023 | 29 848 | 29 50 | 29 87 | 29 76 | 29 92 | 29 84 | 73 | 52 | 62 | 64 | 42 | 57 | 46 | n | calm | sw | se | | 34 | | 09 |
| 18 | 29 752 | 29 718 | 29 23 | 29 65 | 29 60 | 29 73 | 29 72 | 73 | 45 | 63 | 59 | 48½ | 54 | 47½ | w | calm | w | n | | | | |
| 19 | 29 891 | 29 723 | 29 24 | 29 68 | 29 80 | 29 76 | 29 92 | 74 | 44 | 59 | 63 | 46½ | 52 | 50 | n | calm | sw nw | n | 39 | 29 | | |
| 20 | 30 174 | 30 067 | 29 58 | 29 99 | 30·09 | 30 08 | 30 17 | 76 | 43 | 62 | 65 | 42 | 52½ | 50 | nw | calm | sw&s | n | | 15 | | 03 |
| 21 | 30 275 | 30·227 | 29 76 | 30 06 | 30 07 | 30 08 | 30 01 | 82 | 49 | 63 | 59½ | 48½ | 52½ | 54 | s | calm | se sw | e | | | | |
| ☽ 22 | 30 190 | 30 044 | 29 59 | 30 03 | 29 97 | 29 96 | 30 00 | 89 | 53 | 72 | 68½ | 56 | 67 | 60 | sw | calm | s | ssw | | | 0 76 | ·06 |
| 23 | 29·999 | 29 910 | 29 40 | 29 90 | 29 83 | 29 98 | 29·98 | 89 | 61 | 75 | 76 | 50 | 68 | 58½ | e | calm | ese | ese | | | | |
| 24 | 29 948 | 29 916 | 29 33 | 29 86 | 29 90 | 29 98 | 30 00 | 87 | 53 | 67 | 76 | 49½ | 62½ | 55 | e | s | sw | sse. | | | | |
| 25 | 29 956 | 29 901 | 29 35 | 29 87 | 29 84 | 30 00 | 29 98 | 92 | 62 | 70 5 | 75 | 59½ | 61½ | 56½ | s | calm | se | ese | | 05 | | |
| 26 | 30 110 | 29 908 | 29 30 | 29 91 | 30 03 | 30 02 | 30 13 | 74 | 55 | 67 | 66 | 58 | 60 | 55 | nw | calm | ne | nw | | 05 | | |
| 27 | 30 181 | 30·161 | 29 55 | 30 10 | 30 11 | 30 15 | 30 14 | 83 | 50 | 65 | 71½ | 51 | 57 | 55½ | nw | w | sse. | nw | | | | |
| 28 | 30 197 | 30 005 | 29 59 | 30 05 | 29 89 | 30 04 | 29 92 | 88 | 57 | 70 | 68½ | 57½ | 64 | 55 | sw | calm | ssw | sse. | | | | |
| ○ 29 | 29 965 | 29 947 | 29 38 | 29 88 | 29 75 | 29 88 | 29 87 | 76 | 44 | 62 | 67 | 50½ | 53 | 52½ | nw | n | ssw | nw | | 10 | | 37 |
| 30 | 29 828 | 29 474 | 29 24 | 29 56 | 29 20 | 29 64 | 29 57 | 68 | 55 | 60 | 59½ | 48 | 56 | 52½ | sw | calm | ssw | se | 14 | 03 | 2 05 | |
| 31 | 29 708 | 29 529 | 28 94 | 29 45 | 29 47 | 29 58 | 29 56 | 72 | 49 | 60 | 59 | 53 | 52½ | 53 | w | nw | sse | nw | 02 | 16 | | 13 |
| Mean | 29 937 | 29 833 | 29 35 | 29 780 | 29 760 | 29 841 | 29 850 | 76 38 | 52 19 | 63 0 | 64 8 | 47 9 | 54 83 | 51 04 | | | | | 2 10 | 2 63 | 3·97 | 1 17 |

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## XXVII —*Upon the Development of Star-fishes*[*] By M Sars[†]

[With a Plate ]

An unexpected delay having attended the publication of the above work, in which my observations upon the present subject will appear in full, I propose in the mean time to give the substantial results of my investigations upon the development of *Echinaster sanguino*[illegible][‡] (*Asterias sanguinolenta*, O F Muller [§]), and *Asteracanthion Mulleri*, a new species closely allied to *A glacialis* [||]

1st The *Asteriadæ* possess male and female organs of generation separate upon distinct individuals The period of propagation commences in the spring, and is effected by means of ova, which make their appearance in the vesicles of Purkinje and the spot or cell of Wagner contained within these (Pl III figs 3—6 ) These ova are developed gradually within the ovaria, and are given birth to by several broods at distinct intervals of time, becoming probably (for this point has not yet been positively ascertained) detached from the ovaria, and after falling into the cavity of the body, reach the ventral surface of the animal by means of special apertures

[*Observation* —The ova being thus gradually extruded, explains why they are found within the ovary of such very different stages of development (Pl III figs 4, 5), that young as well as ova are met with in the uterine cavity of the mother ]

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[*] Being a fragment from a work entitled 'Beitragen zur Fauna von Norwegen '

[†] From Wiegmann's Archiv, Part 2, 1844 Communicated by A Tulk, M R C S

[‡] Joh Muller observes, that this species is undoubtedly the same as the *E Sarsii* of Muller and Troschel *A sanguinolenta* proves to be the *E seppositus* of the same authors Three *Asteriadæ* of this colour occur in the Northern Seas

[§] *Cribella oculata* of British authors see Forbes's British Star-fishes, p 100

[||] I am not at present authorized in extending such statements to other Star fishes, as it appears indeed that generation is one of those functions of animal life which is subject to most variation even among the lesser groups of allied beings

2nd The ova when laid (fig 7) consist of a chorion investing a small quantity of albumen, and the vitellus, which last soon exhibits the usual process of transverse division (figs 8—10) now ascertained to occur in most classes of animals, they do not escape forthwith into the sea, but are received into a kind of external uterus formed by the parent voluntarily bending the ventral surface of the disc and its arms, and which may be compared in some respects with the pouch of the Marsupial Vertebrata Here the ova are hatched, and the young gliding from their interior remain a considerable length of time, undergoing the progress of development This uterine receptacle is completely closed while the ova are being deposited therein, and until the organs of attachment of the young are perfectly developed During the whole of this time the mother can probably take no nourishment, since the cavity being shut admits of no communication to the oral aperture from without, in this curved and contracted state (fig 2) the Star-fishes have been observed to rest immoveably in the same spot for at least eleven days A truly remarkable example this of the care bestowed upon their young by animals otherwise upon the lowest grade of organization!

[*Obs* —We are acquainted among the lower animals with several examples of a kind of incubation being required by the ova in order that they may attain their development Thus in the *Medusæ* the ova pass out from the ovaria into the pockets formed by the four large oral cæca, in the freshwater Mollusks, as *Unio, Anodonta,* into the external branchial lamellæ, in the Crustacea to beneath the belly or tail, in order to be submitted for a certain time in these situations* to the maternal influences There is however, as far as I am aware, no other example of a uterine cavity being formed voluntarily by the mother on the outside of her own body, and in this respect the instinct of the Star-fishes is indeed unique The circumstance of the Star-fishes taking no nourishment during the incubation of their ova, finds its analogue in the similar behaviour of several other animals, *e g* in the Serpents, according to the observations of Valenciennes, who records an instance of a Python that fasted fifty-six days while engaged in cherishing its eggs ]

3rd The whole of the vitellus becomes converted into the fœtus The latter, upon escaping from the ovum, has an oval cylindrical form (fig 11), is destitute of external organs, and swims about freely in the water by means of numerous cilia covering the body, like the Infusoria or newly-hatched young of *Medusæ, Coryneæ, Alcyoniæ,* &c, which it very much resembles in form This then is the first or Infusorial stage of structure in the Star-fish. After a few days, organs (fig 12, *a a*) begin to grow from that extremity of the body which during swimming was directed forwards These, which are to serve the purposes of attachment, appear in the shape of papillæ, first of all one on one side (fig 12), then two smaller ones upon the other (fig 13, 13 b, *aa*) subsequently the first divides itself into two, so that we now meet with four such papillæ of nearly equal size and club-shaped (figs 14—16, *aa*), and in the middle between them a smaller one (figs 14—16, *b*) By aid of these organs the young fixes itself firmly to the walls of the uterine cavity The body now becomes flattened, depressed (figs 14—17) and circular, and upon one of the broad surfaces, which is thus proved to be the ventral, the tentacula begin to sprout forth as small round papillæ, radiating in ten rows from a common centre, two of which are approximated together, there being only two papillæ in each row (fig 14, *c c*) Upon being detached from the spot to which it had fixed itself, the young still swims in the water through the agency of its vibratile cilia, and always with the organs of attachment directed forwards, but when undisturbed it adheres firmly and immoveably to the place of attachment, never once quitting it In this condition, or the second stage of development, which has been called the Crinoidal,—for we know of no other class of Star-fishes, except that of the *Crinoidea*, which are sessile, at least when young, to compare it with,—the young *Asterias* is still bilateral in symmetry, and the organs of attachment are seen to be constantly directed forwards, and by means of the organs (figs 14, 15, *a a*) already mentioned as being unequally developed upon the two sides of the body, an anterior and posterior, as well as a right and left side, may be defined The dorsal and ventral surfaces are already indicated by the tentacula By degrees, however, this bilateral form passes into the radiary, the third and perfect stage of development in the Star-fish, in which the body becomes pentangular by its border growing out into five very short and obtuse arms (figs 18, 19) The tentacula lengthen out into cylindrical tubes (fig 20, *c c*) with sucking-cups at their extremity, to assist them in the act of creeping At the apex of the arms we remark the organ regarded by Ehrenberg as the eye (fig 18, *b*), the mouth presents itself to view upon the ventral surface, and numerous spines (figs 19, 20) grow upon the integument of the body and arms By and by the organs of attachment begin to diminish gradually in bulk (fig 20, *a a*) and finally to disappear, the swimming movements to cease with the obliteration of the cilia, and the young Star-fish, now become completely radiated in form (fig 20, *a a*), creeps freely about by means of its still disproportionately long tentacles (fig. 21, *c c*) The whole of this development is completed within an interval of from six to seven weeks The perfectly developed young still however abide a long time, at least in one of the examined species (*Asteracanthion Mulleri*), within the uterine cavity of the parent, and are so carried about by the latter In the other species, the *Echinaster sanguinolentus*, I have met with young of a radiary form, and with the organs of attachment not yet obliterated within the uterus, but whether they remain there longer than those of the former species, or how long, I have not yet been able to ascertain

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* According to Joly (Mém sur la Caridina Desmarestii in Ann des Sci Nat. 1843, p 61), the eggs of the Crustacea cannot be withdrawn from the mother without perishing

4th The question presents itself, are the Star-fishes subjected in the progress of development to a metamorphosis or not? The answer to this will depend on the more or less extended sense in which we please to adopt the term If we understand by it, with some naturalists, that abrupt transition from one condition of structure to another, in which, as in the passage of the insect from the larva to the pupa state, and this again to the imago, there is a complete change of external form, then indeed the *Asteriadæ* cannot be said to undergo any such transformation, but if, on the other hand, we take the word in the usually received sense, thus expressed by Lamarck*, "Je nomme metamorphose cette particularité singulière de l'insecte de ne pas naître soit sous la forme, soit avec toutes les sortes des parties qu'il doit avoir dans son dernier état," then we must concede it as fully applicable to the creatures under consideration For their form, we have already learnt, is in those two stages of development that I have considered to be the earliest, bilateral instead of radiated, and the young enter the world without possessing most of the more important parts belonging to their organization, such as mouth, arms and tentacles, these being produced at a subsequent, later period Furthermore, parts are developed, for instance, the above-mentioned organs of attachment, which are destined only for immature age, and therefore disappear entirely as the animal approaches to maturity In this last respect their metamorphosis has been termed retrograde, and offers an example of what Rathke calls "metamorphosis retrograda per dissolutionem†" The reason for the disappearance of the organs of attachment depends upon their becoming utterly useless, on account of the development of tentacles with which the young Star-fish begins a new method of locomotion, and enters into other relations with the external world

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* Hist Nat des Animaux sans Vertèbres, p 277, tom iii

† Rathke must have misunderstood me when quoting my observations from Wiegmann's 'Archiv,' 1837, in his 'Travelling Notes from Scandinavia he alleges "that the Star-fishes possess when very young a delicate stem, which proceeds from the middle of their back, and by which they attach themselves to other bodies"

[*Obs* —We have also seen, so far as we could prosecute the inquiry, that traces of the disappearance of the organs of attachment are still left distinctly visible as two very small papilliform projections, situated close together, and which appear to recede more and more towards the dorsal surface I am now, although unable to demonstrate directly the fact, convinced, that what is called the madreporoid plate in the adult Star-fishes is nothing else than the remnant of the organs of attachment dwindled to a single small tubercle Joh Muller and Troschel, in alluding to the problematical nature of this madreporoid plate, thus express their opinions concerning it "At first sight it appears not unnatural to compare this plate in the *Asteriadæ* and *Echini* or Sea-urchins with the knot of the *Comatulæ*, nor can the eccentric position of the madreporoid plate be taken as any objection to the analogy being drawn, for it is placed in the Clypeasters upon the dorsal pole Meanwhile, however, the constant occurrence of more than a single madreporoid plate in some species of Star-fish militates against the comparison, and its true signification can be probably explained only by the study of its development According to the observations of Sars, the *Asteriadæ* are freely locomotive when young and not attached to rocks"

If now my view of the madreporoid plate being a relic of the organs of attachment be correct, we may very well compare it with the knot of the *Comatulæ* and the stem of other *Crinoidea* The authors already quoted, in objecting to this comparison contained in my observations in Wiegmann's 'Archiv' for 1837, appear to me to have contributed rather to substantiate than invalidate the opinion

This view of mine relative to the nature of the madreporoid plate must tend in an unexpected and remarkable manner to confirm the ingenious theory advanced by Agassiz respecting the bilateral type of the Echinodermata For in addition, the organs of attachment having been already proved to be placed in an interradial interval, through which the long axis of the Star-fish passes, the determination of the front and back of the animal given by the same author becomes decisive, since that end of the body by which the young Star-fish attaches itself must surely be taken for the posterior The Star-fish indeed, in its earliest state of adolescence, swims with this end of the body directed forwards, on which account we might regard it as anterior, and this we have done provisionally upon a former occasion, but the analogy alone of other animals, such as the young of the *Medusæ*, as I have described them in their first or marsupial stage*, and of the compound *Ascidiæ* observed by Milne Edwards†, lead us to the recognition of the fact, that the end which during swimming was directed forwards, in becoming fixed at a later period, proves itself to be in reality the posterior.

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* Wiegmann's Archiv, 1841

† Observ sur les Ascidies composées des côtes de la Manche

In regard to those species of Star-fish that are provided with several madreporoid plates, no theory can at present be hazarded with any degree of probability. Perhaps they possess at an early period several separate organs of attachment.

In conclusion, I would insist upon the naturalist being very guarded in his attempts to generalize, for it is probable that when the relations of development between other genera and species of Star-fishes come to be more closely investigated, greater differences will be detected than could have been *à priori* surmised. Thus *Asteracanthion rubens* differs distinctly from *Echinaster sanguinolentus*, whose genital openings must be placed upon the ventral side, inasmuch as, according to Muller and Troschel, these very apertures are found upon the dorsal region in the *Asteracanthion rubens*, on which account its eggs probably fall into the sea and are left to take care of themselves. This is perhaps the reason why, in spite of my industrious researches at the most different times of the year, I have never found the young, or even any indication of incubating instinct in this species. Another species of the same genus, *Asteracanthion Mulleri*, agrees, as we have seen, with *Echinaster sanguinolentus*. The development of some other Star-fishes appears to be still more anomalous. Thus the animal, formerly* called by me *Bipinnaria asterigera*, I conjecture, from more recent investigations (to be published upon some future occasion), to be only a Star fish provided during its development with a large natatorial apparatus.

I cannot here refrain from observing, that the development of the Star-fishes, so far as we are acquainted with it, exhibits important departures from that of the other Radiated animals, the Polyps and Acalephæ, a greater number at least of which are distinguished by the peculiar form of the incubating organ, or marsupium. The Star-fishes are developed without any such change in the generative process from the state of an ovum to the peculiar type of their group, and in this respect agree with the Articulata and Vertebrata, to which they form the first approximative step, both by their peculiar pointed calcareous skeleton, and in the remarkable instinct with which they nurse their young.]

## EXPLANATION OF PLATE III

*Fig* 1. An *Echinaster sanguinolentus*, natural size, seen from the ventral aspect, with the incubating cavity half open, disclosing within the bright red-coloured young.

*Fig* 2. The same seen in profile, resting with the cavity completely closed; *a*, the madreporoid plate.

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* Beskrivelser og Jagttagelser, etc p 37 tab 15 fig. 40

*Fig* 3 Ovarium of a smaller individual examined 25th of February

*Fig* 4 The same magnified, showing the very unequally developed ova

*Fig* 5 A canal of the same ovarium still more magnified

*Fig* 6 One of the smaller ova from this canal, showing the Purkinjean and Wagnerian vesicles

*Fig* 7 An ovum laid 7th of March The chorion is colourless, the vitellus bright red and smooth, between the two is placed the limpid albumen 7′ nat size

*Figs* 8—10 Exhibit the bipartition of the vitellus in the same ovum *Fig* 8, on the morning of March 9th, *Fig* 9, evening of the same day, and *Fig* 10, on evening of March 10th

*Fig* 11 The young escaped from the ovum and found in the uterine cavity March 17th It is cylindrical, without visible external organs, and covered by cilia This is the first or Infusorial stage of the Star-fish

*Figs* 12—20 The second or Crinoidal stage of development

*Figs* 12, 13 Young found in the marsupial cavity March 17th, with the organs of attachment sprouting forth, *a a* *Fig* 12 is very slightly depressed or still nearly cylindrical, and exhibits the commencement of these organs by two papillæ, *a a*, one of which projects more than the other, but by it the young can as yet not attach itself In *Fig* 13 one of these papillæ has divided into two, and all three serve as instruments of attachment *Fig* 13 *b* The same young one from the front 13′ nat size

*Figs* 14—17 Young met with April 3rd in the marsupium They are tolerably flattened, with four completely developed clavate organs of attachment, *a a*, and a lesser papilla in the middle between them By means of these organs the young fix themselves to the walls of the marsupium *Fig* 14, seen from the ventral surface, exhibits the tentacula, *c c*, sprouting forth as very small papillæ in ten rows radiating from the centre of the body, two of which are approximated, there being two papillæ in each row *Fig* 15 The same young one seen from the dorsal surface *Fig* 16 Ditto from the front *Fig* 17 A young specimen seen from the front, with only three clavate organs of attachment

*Figs* 18—20 Represent the transition from the hitherto bilateral condition of the young to the third or radiary condition

*Fig* 18 One of the young depicted *Figs* 14—16 Further developed, April 15th, and seen from the ventral side The body has become pentangular, and surrounded by a border thicker and more incurved in the intervals of the five sprouting arms The tentacles become larger and more distinct, and at the end of each of the five arms is perceived a small round papilla *b*, regarded by Ehrenberg as an eye

*Fig* 19 The same young represented from the dorsal side The circular sheath distinguished by a groove from the arms Upon the skin numerous spines grow 19′ nat size

*Fig* 20 The same young seen from the dorsal surface April 23rd The tentacles *c c* are lengthened into long tubes and serve now to creep with The organs of attachment *a a* begin to decrease

*Fig* 21 The same on May 4th, dorsal view *Fig* 22 Ventral view The mouth is distinct, the organs of attachment have disappeared, and the young, now become completely radiary, creeps about by means of its tentacles *Fig* 22, nat size

At the end of the month of May the arms had become longer and narrower, and the number of the tentacles increased to five in each of the ten rows

## XXVIII —*On the Fructification of* Gloiosiphonia capillaris, *Carm* By the Rev David Landsborough[*]

[With a Plate ]

In the May Number of the 'Annals of Natural History' there is an interesting article by William Henry Harvey, Esq , at the close of which that distinguished botanist says, "Many interesting additions to our marine flora may be expected from Mr M'Calla's researches on the west coast of Ireland In addition to the present new species (*Codium amphibium*), he has already found fine specimens of some very rare Algæ, as *Gloiosiphonia capillaris, Conferva rectangularis* and others" The *Conferva* I don't know, but the *Gloiosiphonia* was found by me last year in the bay at Saltcoats, I observed it at low water in a little channel betwixt two rocks, and as I was retreating with all convenient speed from the returning tide, lest I should be circumvented as I had been some days before I snatched only a small portion from a large growing bunch of it, thinking that it was some common thing in rather an uncommon aspect On floating it in fresh water, spreading it on paper, and exposing it to the air, in a very short time it changed from a dull brownish red to a fine crimson colour On examining it I was led to conclude that it was *Mesogloia*, now *Gloiosiphonia capillaris*, Carmich , but to be quite sure I sent a specimen of it to Mr Ralfs of Penzance, who has often skilfully and obligingly resolved my algological doubts, and he soon returned it named *Gloiosiphonia capillaris*

My son and daughter found it again this season, early in June, in the same place, at ebb tide it was found rather abundantly in shallow water, but what was thus found was of a dirty yellow colour, and on being spread out it changed only to pale pink David found better specimens by wading to a considerable depth, and catching the plants with his toes The plants found in deep water had a reddish tinge, and on being floated in fresh water and exposed to the air they soon changed into as bright a red as *Delesseria sanguinea*, and made very beautiful specimens

One little specimen he found was rich in fruit, and I write this to describe its three kinds of fructification, all of which I have not seen described, although it may have been done unknown to me The specimen found by my son had only one kind of fructification, and that was very like the hemispherical fruit of *Plocamium coccineum*, except that it was surmounted by a process which gave it an urceolate appearance, or it might be likened to the boss of a buckler (Pl IV fig 4 *a*) The hemispherical base was full of purple-coloured matter

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[*] Read to the Botanical Section of the Glasgow Philosophical Society, June 25th, 1844

A specimen with different fruit was found by my daughter on the shore at Ardrossan It had not the hemispherical urceolate capsules, but it had instead purple tufts not unlike the fruit of *Odonthalia dentata* they had the appearance of a little mass of short truncate ramuli In general they were sessile, but in one case the mass was raised on a short purple pedicel (Pl IV. fig 3 *a*)

The third kind of fructification consists of granules *imbedded* in the branches In the specimens with tufted fructification these were small, of a purple colour, and situated in the upper ramuli, to which they gave a dotted appearance (Pl IV fig 4 *b*) What I am disposed to think the most common kind of fructification occurred in other specimens, viz large *buff-coloured* granules generally imbedded in distorted ramuli (Pl IV fig 5) At times they are only partially imbedded, producing protuberances which are filled with countless very minute granules around the large granule At other times the large buff-coloured granules are quite external but sessile, at a certain stage falling off, not to be lost in the depths of ocean, but in all likelihood to produce a fresh generation of young *Gloiosiphoniæ*

Of these large buff granules there are seldom more than three in one branch, whilst the small granules imbedded in the ultimate branches are like purple points or dots, very numerous, but quite distinct from each other

I may also state that the ultimate ramuli generally seemed jointed like *Ceramium rubrum*, and of a pink colour, yet there were occasionally intermingled little branches with fawn-coloured joints and white articulations so very like *Ceramium diaphanum*, that I should have concluded that this *Ceramium* had fastened as a parasite on the *Gloiosiphonia*, had I not seen that the same little branch which set out as a *Gloiosiphonia*, without any warning given suddenly assumed the aspect of *C diaphanum*

### EXPLANATION OF PLATE IV

*Fig* 1 Capsule of *Polysiphonia parasitica*
*Fig* 2 *Polysiphonia parasitica*, with granules and dwarf capsule
*Fig* 3 *Gloiosiphonia capillaris* *a*, tuft of fruit
*Fig* 4 Ditto, ditto *a*, capsule, *b*, small imbedded granules
*Fig* 5 Ditto, ditto, with large granules in distorted ramuli

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## XXIX —*Brief Descriptions of several Terrestrial* Planariæ, *and of some remarkable Marine Species, with an Account of their Habits* By Charles Darwin, F R S, V P Geol Soc.

[With a Plate ]

In my Journal I have given a brief account of the discovery of several species of terrestrial *Planariæ* it is my intention here to describe them. They all belong to the genus *Planaria*, as restricted by A. Dugès in his memoir* on these animals, and to that of *Polycelis* of Ehrenberg. They may, however, form a section of the genus, being characterized by their more convex and narrow bodies, their more distinctly defined foot, their terrestrial habits, and frequently by their longitudinal bands of bright colours. From their colours, from their convex bodies, from their manner of crawling and the track of slime which they leave behind, and from their places of habitation, they present a striking analogy with some terrestrial gasteropods, especially with *Vaginulus*, with which snail I have several times found them associated under stones. I suspect that, differently from their aquatic congeners, they live on vegetable matter, namely on decayed wood; I suspect this, from having found them repeatedly under this substance, and from having kept some specimens in a box for twenty-one days with nothing else for food, where they increased considerably in size. The species which live under stones, both on the grassy, undulating land of northern La Plata, and on the arid, rocky hills of central Chile, generally inhabit small sinuous chambers, like those frequented by earth-worms, in which they lie coiled and knotted up. They are often found in pairs, and I once discovered a pair attached together by their lower surfaces, apparently in copulation. None of these species have the quick and vivacious movements of the marine species: they progress by a regular wave-like movement of the foot, like that of a gasteropod, using the anterior extremity, which is raised from the ground, as a feeler. One species which I tried could crawl well through moss; another being placed on dry paper was almost killed by it. I put several specimens into fresh water, but they appeared wholly unused to it, and would soon have perished: they seem, however, to prefer damp situations, and the specimens of *P. Tasmaniana*, which I kept in a box with rotten wood, having been neglected to be moistened, all perished, except one large individual which survived quite uninjured, although the wood had become perfectly dry. These animals (especially the *P. Tasmaniana*) had an immediate apprehension and dislike of light, which they showed by crawling, when the lid of the box was taken off, to the under side of the pieces of rotten wood. My observations, as far as they go, on the structure of these terrestrial species, agree with those given by Dugès on the structure of the aquatic species. The figure given by this author of the ramified digestive vessels of *P. lactea* is quite similar to a drawing that I made of this part in the *P. pallida* from Valparaiso (which, from being nearly colourless, allowed the best opportunity of observation), except in the entire absence of ramifications on the internal sides of the two posterior prolongations of the main digestive cavity There is generally a colourless space round the alimentary and genital orifices The mouth-sucker is bell-shaped, with a very short œsophagus when contracted it forms either a globular or star-shaped hard ball I never saw it voluntarily protruded, but have no doubt that it can be, for immersion into very weak spirits of wine or salt water caused its exsertion, and on being touched it was immediately retracted This mouth-sucker is highly contractile, and retains its irritability long after the death and even dissolution of the rest of the body the external orifice, through which it is protruded, consists of a transverse slit. The genital orifice, also, consists of a transverse slit, in the aquatic species it is generally, if not always, circular In my notes on several of the species, I find it stated that the under surface or foot is thickly studded with very minute, angular, opake, white specks may not these serve for the necessarily copious secretion of slime? These animals, when placed on a slip of glass, frequently propelled a globule of air, between their foot and the glass, from their anterior extremity towards their tail, and as the air came in contact with successive parts of the foot, a violent corpuscular movement (curiously resembling microscopical cels disturbed by a stick, and struggling in mud) was produced in the slimy surface I could never perceive it in any part of the foot, except when in contact with air, but it was evident, though less energetic, on parts of the back, and at the extreme anterior extremity of the body I presume that the appearance is due to vibratile cilia, and it is worthy of remark, that M Dugès* suspects that the foot, in the freshwater species, is the chief seat of this respiratory action, from having observed that they frequently arch their bodies, so as to allow fresh water to circulate under it The position of the black eye-spots varies in the different species it is remarkable that, in the *P elongata* from Tres Montes, I could perceive no trace of these ocelli, although this is the largest species According to Prof Ehrenberg's arrangement, depending on the presence and number of the ocelli, this species would rank in his genus *Typhoplana*, but from the variability in number and position of these imperfect organs of vision, I should doubt whether they ought to afford generic characters In the *P pallida* I examined the ocelli with a strong lens, and found that they were not truly circular, the black part lies within a transparent envelope, in this species they are seated on the upper margin of the body, in groups of two and three, exactly over the extreme lateral subdivisions of the intestinal vessel I was not able to see ova within any of the terrestrial species The texture of the body, its prompt dissolution into fluid after death, its power of healing wounds, its irritability and contractile powers, appear to be exactly similar in the terrestrial and in the aquatic species, as described by Dugès I will not here repeat the description which I have given in my Journal (p 31) of the bisection of the *P Tasmaniana*, and the production of two perfect individuals (with the exception of the external orifice for the mouth-sucker) in the course of twenty-five days I will only add, that an individual being divided into many fragments, each crawled in the proper direction, as if furnished with its proper anterior extremity

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* Annales des Sciences Naturelles, October 1828.

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* Annales des Sciences Naturelles, October 1828, p 28.

I found altogether twelve terrestrial species, two in the forests of Brazil, three on the grassy, open country northward of the Rio Plata, one on the arid hills near Valparaiso in Chile, and three in the damp wooded country southward of central Chile the most southern locality was in lat 46° 30′ S I found also one species in New Zealand (which I lost), another in Van Diemen's Land, and a third at the Mauritius, the latter I had not time to examine Hence it appears that the terrestrial section of this genus is widely diffused, but as far as is at present known, only in the southern hemisphere The existence of terrestrial *Planariæ* is analogous to that of terrestrial leeches in the forests of southern Chile and of Ceylon

### 1 *Planaria vaginuloides*

Alimentary orifice situated at two-thirds of the entire length of the body from the anterior extremity, width of orifice $\frac{1}{60}$th of an inch at the distance of $\frac{3}{10}$ths of an inch posteriorly, lies the genital orifice, very plainly marked Ocelli numerous, placed at regular intervals on the anterior extremity, irregularly, round the edges of the foot. Anterior part of the body elongated, with the extremity much pointed and grooved on the under side tail bluntly pointed, body convex, flattened on the top Sides and foot coloured dirty "orpiment orange*", above, with two stripes on each side of pale "primrose-yellow," edged externally with black, on centre of the back a stripe of glossy black, these stripes become narrow towards both extremities Length when fully extended $2\frac{3}{10}$ths of an inch, breadth in broadest part $\frac{13}{100}$ths of an inch

*Hab* Under the bark of a decayed tree in the forest Rio de Janeiro (June)

### 2 *Planaria elegans*

Position of the orifices as in *P vaginuloides* Anterior part of the body little elongated Ocelli absent on the anterior extremity, and only a few round the margin of the foot Colours beautiful, back snow-white, with two approximate lines of reddish brown, near the sides with several very fine parallel lines of the same tint, foot white, exteriorly clouded, together with the margin of the body, with pale blackish purple body crossed by three colourless rings, in the two posterior of which the orifices are situated Length 1 inch, breadth more uniform, and greater in proportion to length of body, than in the last species

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* The colours, when placed between inverted commas, signify that they are given by comparison with Patrick Syme's Nomenclature.

*Hab* Same as in *P vaginuloides*

### 3 *Planaria pulla*

Mouth-sucker, when protruded and contracted in spirits of wine, globular Ocelli numerous, placed at regular intervals on the anterior part of the body Body slightly flattened, gradually increasing in width from the anterior extremity which is much pointed and grooved beneath Back rich "umber-brown," with a central narrow streak of "broccoli-brown" reaching entire length foot broccoli-brown, with two clear spaces for the orifices Length when fully extended 1$\frac{9}{10}$ths of an inch, breadth $\frac{1}{10}$th of an inch

*Hab* Very frequent under stones Monte Video and Maldonado (June and August)

### 4 *Planaria bilinearis*

Ocelli numerous, placed at regular intervals Body subcylindrical narrow, of nearly uniform breadth Colour above pale dirty yellow with two stripes of "umber brown," which become narrower and unite at the two extremities Length when fully extended 1$\frac{3}{10}$ths, breadth $\frac{7}{100}$ths of an inch

*Hab* Same as *P pulla* (June and August)

### 5 *Planaria nigro-fusca*

Alimentary orifice situated at rather less than two-thirds of the entire length from the anterior extremity genital orifice, with the body contracted, is situated at the $\frac{25}{100}$ths of an inch posteriorly Ocelli very numerous, those on the extreme tip very minute and placed at regular intervals, those on the margin of the body grouped by two and three together Body much depressed, tapering suddenly towards the anterior extremity, tail abruptly terminated in a point Above uniform blackish brown, beneath pale Length when fully extended 2 inches, breadth $\frac{3}{10}$ths of an inch

*Hab* Under rotten wood Maldonado (May)

### 6 *Planaria pallida*

The alimentary and genital orifices $\frac{2}{10}$ths of an inch apart, when the body is partially contracted mouth-sucker when dissected out of the body $\frac{15}{100}$ths of an inch in length, its margin very sinuous Ocelli numerous, eleven close together, being placed on the anterior extremity, and the others in groups of two and three on the sides, and chiefly on the anterior half of the body Body much depressed and flat, with both extremities finely pointed Upper and lower surfaces white, with the pinkish intestinal vessel seen through Length when crawling 3 inches, breadth $\frac{2}{10}$ths of an inch

*Hab* Under stones on the dry hills near Valparaiso (July)

### 7 *Planaria elongata*

Alimentary and genital orifices obscure Ocelli absent posterior extremity very obtusely rounded Above "umber brown," with a narrow medial line of darker brown, sides narrowly edged with pale brown, bordered with the umber-brown, beneath pale brown Length when crawling 5 inches, when closely contracted $1\frac{4}{10}$ths of an inch breadth when crawling $\frac{15}{100}$ths, when contracted $\frac{4}{10}$ths of an inch

*Hab* On rotten wood in mountain-forests C Tres Montes, lat 46° 30′ S, Western America (December)

### 8 *Planaria semilineata*

Body convex Above greenish black, with minute white punctures, on anterior half of body four parallel bands of "gall stone yellow," of which only the central and approximate pair are prolonged into the posterior half of body foot leaden colour, with colourless spaces for the orifices

*Hab* Under stones, on one of the Chonos Islands (north of C Tres Montes) (December)

### 9 *Planaria maculata*

Edges of the body very thin, breadth nearly uniform Upper surface quite black, with numerous, oblong variously sized spots of yellow foot mottled white and black Length when crawling $1\frac{7}{10}$ths, breadth $\frac{4}{10}$ths of an inch

*Hab* Forest of Valdivia (February)

### 10 *Planaria Tasmaniana*

Mouth-sucker widely extensile alimentary orifice placed nearly in centre of the body, genital orifice $\frac{1}{10}$th of an inch posteriorly but when the animal crawls it is $\frac{2}{10}$ths of an inch distant Genital orifice very distinct, submargined Ocelli scattered round the entire margin of the foot but most frequent at the anterior extremity Both extremities pointed Colour dirty "honey-yellow," with a central dark brown line bordered on each side with a broader line of pale "umber-brown" foot quite white Length when crawling $1\frac{5}{10}$ths, when contracted $\frac{8}{10}$ths of an inch.

*Hab* Beneath decayed trees in the woods of Van Diemen s Land frequent (February)

I will now briefly describe five marine species of *Planaria,* which are remarkable, either as presenting novel points of structure, hereafter probably forming the types of new subgenera, or from the situations which they inhabit

### 1 *Planaria* (?) *oceanica*

Plate V fig 1 Under-surface magnified

Anterior extremity neck-shaped, with two ear-like processes.

Ocelli, I believe, absent Posterior extremity broadly rounded Membranous margin of body jagged Length $\frac{2}{10}$ths of an inch Colour pale, uniform Near the neck there is a quadrangular, internal clear space, apparently lined by a membrane, within which there is a dark-coloured spot, and externally close by it an orifice, which the animal can dilate and contract at pleasure Close behind this there is an internal oval space, within which there is a second dark spot united to a delicate vessel, I was unable to distinguish any orifice near this point these organs form, I presume, the reproductive system Close behind these organs there is a dark space formed by the union of eleven, branching intestinal cavities, in the centre of which there is a longitudinal orifice situated rather behind the centre of the body Through this orifice the animal can protrude a folding mouth sucker when it begins to unfold it is seen to be drawn into eight folds, as represented at (B)

*Hab* Open ocean, lat 5° S , long 33° W (February)

This I believe is the first instance of a species of this genus being found in the open sea, at the distance of 150 miles from the nearest part of S America, and 80 miles from the small island of Fernando Noronha

## 2 *Planaria* (?) *formosa*

Body much depressed, oval In the posterior half, on the under side, there is a very large alimentary orifice with folding lips (but apparently with no exsertile mouth-sucker), from which the two main intestinal cavities branch Near the anterior extremity there is a minute orifice, and between it and the mouth a second orifice these the animal can dilate and contract, they lie over an opake, wedge-formed, internal mass, and form, I presume, two genital orifices Back dotted with purplish red with a central band of vermilion-red," edged with white this band sends off three branches on each side, at the extremity of each of the two anterior branches there is a longitudinal group of black ocelli, and before these two other circular groups forming together four groups of ocelli Length when extended half an inch Inactive in its movements

*Hab* On corallines, at a depth of 30 fathoms, in southern Tierra del Fuego (December)

## 3 *Planaria* (?) *macrostoma*

Plate V fig 2 Under-side magnified

External alimentary orifice situated in the posterior half of body mouth-sucker nearly subcylindrical, bell-shaped, very long when contracted within the body it lies in a serpentine position when partly protruded it has the figure as represented, when fully extended it tapers only slightly from its mouth to its base, and is so long that the animal can pass it from the under surface over the entire width of its back Its base is united, in the middle of the body, to the three principal branches of the intestinal cavity, the two posterior branches unite and form a ring, enclosing the space in which the mouth sucker and its external orifice are situated. The three main branches receive the moss-like subdivision of the intestinal cavity, which reach all round nearly to the margin of the body. The main, medial, intestinal cavity ends at the anterior extremity in a small, opake, wedge-formed mass; on each side of which, nearly on the dorsal surface, a black ocellus is situated. Between the lateral branches on each side of the medial cavity, seven or eight internal spherical cavities lie, including opake balls, which I presume are immature ova; the anterior ones were most developed: they were not present in the smaller specimens, or in all the full-grown ones. I was unable to discover any genital orifice, though no doubt one or two exist: near the posterior extremity (at B) there was a colourless space, but I could not see any orifice. Anterior extremity square, truncate, with the edges thin and prehensile; the animal attaches itself by this part, almost like a leech with its sucker, and thus drags its body: posterior extremity broadly rounded. Above, faintly coloured brownish purple in striæ, with a colourless space over the alimentary orifice. Length $\frac{2}{10}$ths; breadth $\frac{6}{100}$ths of an inch.

*Hab.* Congregated in numbers under stones, in *brackish water*; Chonos Archipelago (west coast of S. America) (December).

The arrangement of the main branches of the intestinal cavity is the same as in the terrestrial *Planariæ*, with the exception of the two posterior branches being united near the extremity of the body into a ring, which structure I have not met with described in any other species. Hence this species probably ought to form the type of a new subgenus. I may here mention that I found amongst these islands an elongated marine species (with a very distinctly formed head placed on a narrow neck) which had the power of crawling either backwards or forwards,—a power I have never seen in any other species.

### 4. *Planaria* (?) *incisa*.

PLATE V. fig. 3. Under surface magnified.

Body oval, very much depressed, highly contractile; margin sinuous, anteriorly deeply indented, posteriorly less so. Ocelli very numerous and crowded together in several rows on the indented anterior (as is known by its progression) margin. Along the centre of the body an intestinal vessel extends, and in the middle of this (B) there is a well-closed orifice, through which the animal can protrude a thin, much-folded, sinuated mouth-sucker; this when fully expanded is quite as wide as the body. Posteriorly, on each side of the central vessel, there is a mass, apparently of immature ova. Near the posterior extremity there is a second subterminal orifice (D), through which, when the animal was placed in spirits, a little globular mass was protruded, like a small, much-contracted mouth-sucker. Near to the anterior extremity there are two slightly retractile paps with orifices, of which the anterior one is the largest. From this point diverging rays (intestinal cavities?) are sent off, which reach nearly to the margin of the entire body: when the animal contracts itself, the back is raised in slight ridges, corresponding with these rays. This species, therefore, has four orifices on its under surface. Back finely reticulated with brownish purple. Length 1 inch, breadth three-quarters of an inch.

*Hab.* Under stones on the sea beach, St. Jago, Cape Verd Archipelago (February).

This species is exceedingly active and irritable in its habits: it lives, like a *Nereis*, under stones firmly imbedded in the beach at low-water mark. It has the power of adhering with great tenacity to smooth stones: another allied species had the same power, could also swim well by a vertical movement of its body, and frequently rolled itself into a ball.

With respect to the four orifices, I presume, as in the *P. formosa*, the two anterior ones belong to the reproductive system. The central orifice undoubtedly is the mouth: the posterior one would naturally be thought to be the anus; but I am doubtful of this, considering the little globular body which was protruded through it, and from the existence in the following allied genus of a double mouth.

## DIPLANARIA (nov. genus).

Alimentary orifice double, with two exsertile mouth-suckers. Two genital orifices in the posterior part of the body. A large forked ovarium (?). Ocelli in four groups, two superficial and two more deeply seated. The characters here given appear to me absolutely to require the institution of a new genus.

### *Diplanaria notabilis.*

PLATE V. fig. 4. Under-side magnified.

Body very much depressed, with the edges very thin; anterior extremity thrice as broad as the posterior. On the under surface, towards the anterior extremity, there is a clear space, over which on the back, the ocelli are situated; into this space, on all sides, the branching, clear, intestinal cavities enter. Each intestinal cavity generally bifurcates three times before its fine extremities reach the margin of the body. Towards the posterior extremity there is a second clear space (with the two orifices D and E), into which also the surrounding intestinal branching cavities enter; these two spaces are united by two longitudinal clear spaces (obscured by ovules in the drawing) passing on each side of the elongated, opake, white, central organ. This organ, when the animal is contracted, has the appearance represented in the drawing, namely of an internal, elliptic mass, narrowing at each end, with deeply sinuated borders, and with two external, perfectly closed orifices over it, as shown at (B) and (C). But when these two orifices are opened, from both of them broad, shallow, saucer-like mouth-suckers are protruded, as represented at (F); these, when contracted within the body, appear united, and form a single, elliptic, sinuated body. These two mouth suckers are quite similar, they are much shallower than those of any other species of the family which I have seen, their membranous edges are very thin, narrow, transparent and sinuous. In the act of contraction they become folded in a complicated manner, like the bud of a flower. I was able easily to dissect them out of the body, and they retained in the characteristic manner described by Dugès, and as in the terrestrial *Planaria*, an extreme degree of irritability and contractile power, long after the rest of the body had ceased to live.

In the elliptic space surrounding the two mouth-suckers when contracted, and between the mouths of the lateral, branching, intestinal cavities, innumerable ova are arranged in groups from two to four in each, these are represented in the drawing only by double dots. These ova were easily separated, they are spherical, $\frac{3}{300}$ths of an inch in diameter, and contain a central opake mass. In the posterior clear space there are two minute but quite distinct, orifices (D and E), which I do not doubt are the reproductive pores. Into this clear space a large fork, filled with opake white matter, enters, as is shown in the drawing, this matter consists of minute, white globules in chains, imperfectly united together. I believe these are immature ova, and hence I suppose that the fork is the ovarium, from which the ova pass into the clear spaces surrounding the mouth-suckers and are there matured.

The ocelli are black and circular, and are arranged in four groups, two of which are round, and two in elongated bands inclined to each other. The ocelli in the bands are not seated on the dorsal surface, but deep within the body near the ventral surface. Colour pale "tile-red," darkest on the dorsal ridge with colourless spaces over the genital orifices and over the ocelli. Length $\frac{5}{100}$ths of an inch, breadth of anterior part of body $\frac{3}{10}$ths, of posterior part $\frac{1}{10}$th of an inch.

*Hab.* Under stones in tidal pools, Chonos Archipelago (Western S. America) (December).

This animal is very active, can crawl quickly, and can swim well by the movements of its thin marginal edges. It can adhere firmly to stones.

This is the most complicated and singular form of the large family of *Planariæ* which I have seen or met with described. The presence of two alimentary orifices and two mouth-suckers is another and interesting point of affinity between the *Planariæ* and the true parasitic worms, in which the number of mouths so often exceeds one. I believe that the presence of the large forked ovarium, and of groups of ocelli situated at different depths, are peculiarities of structure confined to this genus. If the small mass protruded from the posterior orifice (D) of the *Planaria* (?) *incisa* was really a small contracted mouth-sucker, this species is closely allied to our present new genus, with the chief difference of the two genital orifices being near the anterior, instead of the posterior extremity.

I will conclude by remarking, that the family of *Planaria* is most widely diffused, and is adapted to the most different stations on the land, it is adapted to forests and plains, in hot, temperate, and dry climates, in water, under all latitudes, to fresh, brackish and salt, on sea-beaches, at the depth of 30 fathoms, and in the open ocean

## XXX —*Catalogue of Irish Entozoa, with observations* By O'Bryen Bellingham, M D, Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c

[Continued from p 165 ]

### Genus 17 Bothriocephalus

(Derived from *βοθρίον*, *fovea* and *κεφαλὴ* *caput* )

*Gen Char* —Body long flat, soft, and articulated Head subtetragonal, with two or four opposite depressions

The genus *Bothriocephalus* was established by Rudolphi, and has been adopted by all zoologists since Previous to his time the species were confounded with those of the genus *Tænia*

The species are common in fish and birds, more rare in the mammalia, and very rare in reptiles, they usually inhabit the alimentary canal, sometimes the abdominal cavity The genus is not very numerous in species, only thirty-four being enumerated by Rudolphi, of which ten are doubtful He has arranged them in two subdivisions, in one the head is armed, in the other this part is naked or unarmed

#### A Inermes

#### a *Dibothrii*

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| 1 | *Bothriocephalus latus* * | Small intestines of man (*Homo*) |
| 2 | ————— *claviceps* | Intestines of eel (*Anguilla acutirostris*) |

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* We are indebted to Bonnet for the first description approaching to accuracy of the *Bothriocephalus latus*, but it is only within a few years that its zoological characters have been properly understood, and we are indebted to Bremser for having first determined these, who removed it from the genus *Tænia*, to which it had long erroneously been supposed to belong

The *Bothriocephalus latus* is the only species of the genus which inhabits the human intestines, and it has received a number of different names It is the *Tænia lata* of Linnæus, Pennant and Turton, the *Tænia* articulos non demittens and the *Tænia* à anneaux courts' of earlier writers, the *Tænia vulgaris* and *Tænia grisea* of others, the *Tænia inerme umana* of Brera, the *Tænia osculis superficialibus* of

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| 3 *Bothriocephalus proboscideus* * | Intestines and pyloric appendages of salmon (*Salmo Salar*)<br>Pyloric appendages of salmon trout (*Salmo Trutta*)<br>Intestines of Gillaroo trout (*Salmo Fario*, var ) |

Hooper , *le Tænia large* of Cuvier , and *le Bothriocephale de l'homme* of Lamarck

The colour of this species is white, seldom however so pure a white as the *Tænia solium* After it has remained in spirits of wine it often acquires a grayish tinge, from which circumstance Pallas gave it the name of *Tænia grisea*

The head has somewhat an ovoid shape , the neck is in general not distinct The articulations of the body are very broad in proportion to their length The orifices which lead to the ovaries are situated in the centre of the flat surface of each articulation, and around them the oviducts are seen, which have a radiated or stellate appearance In some instances we can distinguish a minute body projecting from the genital pore, which is supposed to be the male organ

The *Bothriocephalus latus* inhabits exclusively the small intestines, and as many as three or four have been found in the same individual Its length is variable, but is said to be in general greater than that of the *Tænia* It seldom or never parts with single joints (as occurs with the *Tænia solium*), owing to the longitudinal muscular fibres being continued from one articulation to another , in the *Tænia solium* these fibres are distinct in each articulation

The *Bothriocephalus latus* is not uncommon in the intestines of the inhabitants of Poland, Russia, and part of France It is so general in some parts of Switzerland as to have received the name ' Ver de Genève ' It is very rare in England, Germany, Holland, India, Egypt and the United States, where it is replaced by the *Tænia solium* The only specimen which I possess is a portion of one found in the intestines of an individual who died several years ago in one of the Dublin hospitals, which was given to me by my friend Dr Aquilla Smith of this city I have only heard of two other instances in which it has occurred in Dublin , once it was met with by the late Dr Macartney, and once by Dr Graves, but I have had no opportunity of examining the specimens in either case

* The *Bothriocephalus proboscideus* is exceedingly common in the genus *Salmo* , it is a very beautiful species, and will live for several days after the death of the animal which it inhabits It abounds most in the largest and fattest salmon I have found them in such numbers in the intestines and pyloric appendages of the *Salmo Salar* as almost completely to block up these parts, which contained nothing besides but a white tenacious mucus The fish in which they were most numerous were amongst the finest in the market , which would help to prove, that in these animals at least, the pre-

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| 4 | *Bothriocephalus infundibuliformis* ? * | Intestines and pyloric appendages of salmon trout (*Salmo Trutta*) |
| 5 | ——— *microcephalus* † | Intestines of sun-fish (*Orthagoriscus Mola*) |

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sence of entozoa in the alimentary canal is not to be regarded as the result of disease

* In the intestines and pyloric appendages of the salmon trout (*Salmo Trutta*) I have, upon several occasions, found a *Bothriocephalus* which has many of the characters of *B infundibuliformis* It resembles generally the *B proboscideus*, but differs from it in some respects

The length is about 12 inches or upwards colour white, body thick, diameter a third of a line anteriorly, 2 lines posteriorly The head is large, triangular or subsagittate, the depressions (*bothrii*) deep and of an oblong shape The neck is very distinct and has a greater diameter than the articulations immediately next to it, the articulations near the neck are somewhat funnel-shaped, in the rest of the body each second joint is more than double the length of that before it, near the posterior extremity all the articulations are short, the terminal joint is twice or three times the length of those anterior to it and is rounded at its extremity A depressed median line is seen upon the body running its whole length

When the animal is alive and in motion the shape of its head varies much, and when protruded fully it presents nearly the same character as after lying in spirits of wine, at other times the bothrii resemble merely two longitudinal lines, when the animal is very much contracted, the head resembles a rounded tubercle, with two circular depressions upon its anterior surface In a large specimen now before me the head has a much greater diameter than the articulations nearest it, its base being nearly double their width The bothrii are enlarged, contracted and elongated constantly, and when the body is fully contracted the animal appears to be almost cylindrical

† In the intestines of a very large sun fish (*Orthagoriscus Mola*) which I examined, and which is now in the museum of the Natural History Society of Dublin, I found an immense number of the *Bothriocephalus microcephalus*, several of which lived in a vessel of fresh water for twenty-four hours

The longest measured upwards of 3 feet in length, at the widest part of the body it was something more than 3 lines in diameter Colour white The head is small, triangular or sagittate, and terminates anteriorly in a little papillary eminence The bothrii two in number, are of an oval shape though wider posteriorly There is no neck The anterior articulations are funnel-shaped, becoming longer gradually, the next are shorter, the terminal articulations appear to be merely transverse rugæ in some specimens, the last articulation is more acute than the others This species is believed to be peculiar to the sun-fish

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| 6 | *Bothriocephalus punctatus*[*] | Intestines of turbot (*Pleuronectes maximus*)<br>Intestines and pyloric appendages of sea-scorpion (*Cottus Scorpius*) |
| 7 | ——————— *solidus*[†] | Abdominal cavity of stickleback (*Gasterosteus aculeatus*) |

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[*] The *Bothriocephalus punctatus* is very common in the intestines of the turbot (*Pleuronectes maximus*), and of the sea-scorpion or father lasher (*Cottus Scorpius*). Dr Drummond has found it in addition in the brett or brill (*Pleuronectes rhombus*), and it has been very accurately described by him in the New Series of the 'Mag. of Nat. Hist.' for the year 1839. I shall therefore only observe here, that the peculiarity in this species which is noticed by Rudolphi was apparent in my specimens, viz. that this animal when recent is perfectly white, but after having remained for some time in spirits of wine or in water, a black spot appeared in the centre of each articulation in the situation of the ovaries. My friend Dr Drummond has also noticed this circumstance, and considers that it is connected in some way with the maturity of the ova.

[†] Although I have examined a large number of the *Gasterosteus aculeatus*, I have not succeeded in finding the *Bothriocephalus solidus*, and have placed it in this list on the authority of my friend Dr Allman, the Professor of Botany in Trinity College, Dublin, who discovered it in specimens of the *Gasterosteus aculeatus* from the neighbourhood of Cork. Its habitat differs from that of most species of *Bothriocephalus*, as it occurs only in the cavity of the abdomen, not in the intestinal canal. The animal which it inhabits would appear sometimes to have the power of getting rid of it, as the *B. solidus* has been found alive in the water of ponds in which these fish are abundant. It is probable that from this circumstance Linnæus was led to the opinion that the *Tænia* (to which genus it formerly was supposed to belong) could exist out of the bodies of living animals. Dr Baer relates, that "in an excursion up the Pregel with the late Prof. Eysenhandt in search of water-plants, the first object which attracted our attention was a tape-worm; on continuing our searches we found nearly a dozen in the water, four of which were alive, the others dead or nearly so. This (he adds) brought to my recollection Linnæus's *Tænia*, found in water. With the exception of vast numbers of the *Gasterosteus pungitius*, scarcely any other animal was observed in the water. Many of these fish were taken; in all the abdomen appeared much swollen, and on opening them a *Bothriocephalus solidus* was found, which, when extended, was longer than the fish in which it was contained. Every specimen of fish we opened contained a worm, and the fishermen assured us that they were rarely met with without them. It is supposed that these worms escape, or are forced from the fish into the water, in which they will live for a considerable time."

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| 8 | *Bothriocephalus nodosus* | Small intestines of pomarine skua (*Lestris pomarinus*)<br>Small intestines of dusky grebe (*Podiceps obscurus*) |
| | b *Tetrabothrii* | |
| 9 | *Bothriocephalus macrocephalus** | Small intestines of second-speckled diver (*Colymbus septentrionalis*)<br>Small intestines of horned grebe (*Podiceps cornutus*) |
| 10 | ——— *tumidulus* | Intestines of skate (*Raia Batis*) |
| | B Armati | |
| | (*Omnes tetrabothrii*) | |
| | a *Uncinati* | |
| 11 | *Bothriocephalus coronatus* | Large intestines of skate (*Raia Batis*) |
| | b *Proboscidei* | |
| 12 | *Bothriocephalus corollatus* | Stomach, small and large intestines of dog-fish (*Squalus Acanthias*) |
| 13 | ——— *paleaceus* | Large intestines of dog fish (*Squalus Acanthias*) |
| | *Species dubiæ* | |
| 14 | *Bothriocephalus* † | Intestines and pyloric appendages of cod (*Gadus Morrhua*)<br>Intestines and pyloric appendages of haddock (*Gadus Æglefinus*) |

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* Upon several occasions I have found the *Bothriocephalus macrocephalus* in large numbers in the small intestines of the second-speckled diver (*Colymbus septentrionalis*). They usually were most abundant in that part of the intestinal canal near the gizzard; none existed in the large intestines. They are from 2 to 6 inches and upwards in length, colour white; the articulations very readily separate from one another when the animal is placed in water. The head is large, and somewhat tetragonal in shape, with four lateral depressions, two upon each side; each is contracted in the centre of the long diameter, which gives it the appearance of being divided into two portions. The neck is very short; in some the greatest diameter of this part was next the head, in others next the body. The articulations in front are almost linear; they then increase in length and eventually become campanulate.

† The species of *Bothriocephalus* which inhabits the intestines and pyloric appendages of the cod (*Gadus Morrhua*) and of the haddock (*G. Æglefinus*) is exceedingly common. I have seldom examined one of these fish without finding it, and yet it has been altogether overlooked by Rudolphi and other writers. That it is a *Bothriocephalus*

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| 15 | *Bothriocephalus* | Large intestines of skate (*Raia Batis*) |
| 16 | ———— * | Small intestines of little grebe (*Podiceps minor*) |
| 17 | ———— | Intestines of arctic tern (*Sterna arctica*) |
| 18 | ———— | Large intestines of red necked grebe (*Podiceps rubricollis*) |

appears from the disposition of the ovaries, but I have never succeeded in detecting the bothrii upon the head; in fact this part is inclosed in a kind of tubercle which is found upon the peritoneal surface of the pyloric appendages (the body of the animal lying loose in the intestines), and I have drawn this part out to a very fine point, but have not been able to determine its characters. My friend Dr Drummond has also found this species in abundance in cod taken in the neighbourhood of Belfast.

* In the intestines of the little grebe (*Podiceps minor*) I found several specimens of a *Bothriocephalus* which does not appear to have been described, and which seems to unite the genus *Ligula* with the *Bothriocephalus*. It belongs to the first division in Rudolphi's arrangement *Inermes*, and to the subdivision *Dibothrii*. The length is from an inch and a half to two inches; colour when recent reddish yellow. The head is somewhat subsagittate; the bothrii, two in number, are placed, one upon the dorsal, the other upon the abdominal surface of this part; they are long, slightly elliptical, or in the form of a simple fissure, extending the whole length of the head and reaching into the articulation next it. There is no neck. The articulations are broad, rugose, and very short. In the centre of the posterior articulations the circular orifices of the ovaries are seen, from each of which a *lemniscus* projects, which is long and clavate.

## XXXI.—*On the British* Desmidieæ. By JOHN RALFS, Esq., M.R.C.S., Penzance*.

[With a Plate.]

### TETMEMORUS, n. g.

Frond simple, elongated, straight, cylindrical or subcylindrical, slightly constricted in the middle; segments emarginate at the end, but otherwise quite entire.

I have instituted this genus for the reception of two plants which are placed in *Closterium* by Meneghini, but do not well agree with the other species in that genus.

The fronds are elongated as in *Closterium*, from which, however, this genus may easily be distinguished by the emarginate ends; the same character and the elongated fronds will separate it from *Cosmarium*.

From *Euastrum*, with which it agrees in the emarginate extre-

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* Read before the Botanical Society of Edinburgh, April 11, 1844.

mities, it differs in being cylindrical or nearly so, and in the segments being neither lobed nor sinuated, the fronds are also free from inflated protuberances

Starch is found in both species

1 *T Brebissonii* Segments in the front view with parallel sides, but in the lateral view attenuated, the ends without any projecting processes *Closterium Brebissonii*, Mngh Syn Desmid in Linnæa 1840, p 236 *Closterium* —— (sp 9); Bailey, Amer Bacil in Amer Journal of Science and Arts, vol xli no 2 pl 1 fig 38

Ashdown Forest, Warbleton, Henfield, &c, Sussex, and near Tunbridge Wells, *Mr Jenner*, Dolgelley, Carmarthen and Penzance

Fronds about six times longer than broad, with a slight constriction in the middle, the front view shows the lateral margins of the segments nearly straight, with rounded and emarginate ends The lateral view is more constricted in the middle, and the segments are attenuated towards the end

The endochrome is dark green, and there is a series of large globules down the middle in a single row, either straight or with some irregularity

The fronds, when empty, are found to be minutely punctate, the puncta being arranged in longitudinal rows

This species differs from the following one in having its front and lateral views unlike each other, and its puncta arranged in longitudinal lines

PLATE VIII fig 1 *Tetmemorus Brebissonii* *a*, front view, *b*, side view, *c*, empty frond, *d*, segment

2 *T granulatus* Fronds tapering both in the front and lateral views, and ending in a colourless projecting lip-like process *Closterium granulatum*, Breb in Mngh Synop Desmid p 236

In boggy pools, Ashdown Forest and Henfield, Sussex, bogs at Fisher s Castle near Tunbridge Wells, *Mr Jenner*, Dolgelley and Penzance

Fronds cylindrical, about six times as long as broad, very slightly constricted in the middle, fusiform The extremities always have a colourless projecting lip-like process which extends beyond the notch

The colouring matter is dark green, and a few large green globules are arranged in a longitudinal row down the middle

The empty frond is minutely punctated, the puncta generally form one or two transverse lines in each segment near the central constriction, and in the other parts of the frond they are not in rows, but scattered

Under a low power of the microscope this species much resembles the preceding, but it may always be distinguished by the front and lateral views being similar and only differing in the terminal notch, which is not seen in the lateral view There is also beyond the notch a remarkable lip-like projection which is wanting in *Tetmemorus Brebissonii*, and the puncta seen in its empty frond are not arranged in longitudinal rows

PLATE VIII fig 2. *Tetmemorus granulatus* *a*, front view, *b*, side view, *c*, empty frond, *d*, fronds conjugated, *e*, spore fully formed, *f*, spore separated from the segments, *g*, side view of conjugate fronds

P S —Since the preceding was written I have met with this species in a conjugated state The specimens were gathered near Dolgelley, and formed a mucous stratum on the moist soil

The fronds were smaller than usual, I did not observe any in the first state of union, but it appears that after conjugation the segments of the fronds are separated by the formation of a large, quadrate, central cell, in which all the endochrome of both fronds is collected and the empty segments remain loosely attached to the corners of this cell The endochrome at first fills the cell, large starch globules being scattered throughout the minutely granular substance, but at length it becomes a dense, round, homogeneous spore of a dark green colour which finally changes to an olive-brown In this stage the segments of the original fronds fall off, leaving the quadrate cell inclosing the spore

In the front view, as stated above, the cell is nearly square, the sides are concave, and the angles rounded and slightly produced A lateral view shows that the cell and spore are both compressed

This is the first opportunity I have had of examining any of this family in a conjugated state, and I have described it at some length because it appears to me a very interesting and important fact in support of their claim to belong to the vegetable kingdom, exhibiting in the present instance a striking similarity to the change which takes place during the formation of similar spores in *Staurocarpus* among the *Conjugatæ*

In *Staurocarpus* after conjugation a subquadrate cell is formed, within which the endochrome is collected The latter is at first of the same form as the cell, but in one species at least is at length condensed into a large, compact, globular spore, and in every species the cell with the contained spore finally separates entirely from the filaments with which it is connected In this separate state I know no character by which to distinguish the spore of the *Tetmemorus* from one belonging to a species of *Staurocarpus*, and in both, the spore, when tested by the tincture of iodine, is found to be almost wholly composed of starch*

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* Examples of the shape of the cell in species of *Staurocarpus* may be seen in the plate illustrating Mr Hassall's valuable papers on the Freshwater Algæ —Annals of Nat Hist vol xii pl 7

## MICRASTERIAS, *Ag* (*Meneghini*)

Fronds simple, plane, orbicular, deeply divided into two segments, each of which is lobed, the lobes are radiant and inciso-serrate

The fronds are simple, circular, flat, divided nearly to the centre, so that the segments are united only by a narrow chord The segments are semiorbicular and in close contact with each other along their entire breadth, each is deeply divided into lobes which are arranged in a radiant manner, each lobe is regularly and deeply cleft, and the margin is dentate

The orbicular, plane, and deeply incised fronds will distinguish this from all the other genera in this family In *Euastrum*, the only one with which it can be confounded, the fronds are generally oblong, and the lobes are not incised

Starch granules are very evident in this genus Young fronds differ so much in appearance from the full-grown plant, that they may be mistaken for another species

As the plants to which Agardh affixed the name of *Micrasterias* are probably all included under the above description, I have followed Meneghini in retaining that name for this genus, especially as it seems to me that not one of Agardh's species is contained in the *Micrasterias* of Ehrenberg, who intended by it a very different genus, the *Pediastrum* of Meyen*

1 *M rotata* Fronds smooth, lobes broadly cuneate, approximate, the end lobe emarginate, the others deeply incised the divisions notched and dentate *Micrasterias rota*, Mngh Syn Desmid in Linnæa 1840 p 215 *Echinella rotata*, Grev in Hook Br Fl vol ii p 398 (1830) *Eutomia rotata*, Harv Br Alg p 187 *Euastrum rota*, Ehr Infus p 167 tab 12 fig 1, Pritch Infus p 195 figs 121 to 123, Bailey, American Bacillaria pl 1 fig 22 and fig 24 *Micrasterias*, Ag Bot Zeit 1827?

In freshwater pools, probably common Sussex, near Southampton, &c, *Mr Jenner*, Henfield, *Mr Borrer*, frequent about Barmouth, *Rev T Salwey*, Dolgelley, Cwm Bychan, Carnarvon, Carmarthen, Swansea, Dartmoor and Penzance

This plant is not uncommon, and frequently occurs in considerable quantities, and unmixed with other algæ

The fronds are large, and appear to the naked eye like minute green dots, they are nearly circular, each segment is deeply divided into five lobes The end lobe is the narrowest, and in the

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* "Nomen a cl Agardh propositum et perperam ab aliis Pediastris affixum, et cum novo illo Euastrum commutatum servandum —Menegh Syn Desmid in Linnæa 1840, p 215

mature plant appears more turgid than the rest of the segment, the other lobes are deeply bifid. All the lobes, as well as the divisions of each lobe, are cuneate, all the incisions have their sides approximate and point towards the centre of the frond. The margin of the frond is dentated and is frequently colourless.

The young frond differs considerably from the adult form: its terminal lobes are very broad with convex and entire margins, whereas the other portions are dentate or spinulose-dentate at their margins, the lobes not being yet divided there are no incisions, or very short ones, whilst a slight notch often points out the future clefts, the younger the frond the more entire is its margin.

As in this plant the portion connecting the two segments is very narrow, the mode of increase by division is well shown. The central connecting portion elongates and becomes converted into two colourless rounded lobules, which increase in size, gradually acquire colour, and finally become lobed and miniature representations of the segments of the frond, and then two new fronds are formed by separation.

The new segments frequently acquire considerable size before they become lobed. As two fronds are formed by separation before the new segments are fully grown, specimens often occur in which the segments differ in size, and the lobes of the smaller one are sometimes not fully formed.

Plate VI fig 1 *Micrasterias rotata* a, full-grown fronds, b, young fronds, c, mode of increase.

*Micrasterias apiculata*, Mngh, which differs from this species in having its surface furnished with spines, has not been detected in this country.

2 *M Melitensis*, Mngh. Frond smooth, all the lobes deeply bifid, the divisions linear and bidentate at the extremity, both the lobes and their divisions are divergent. Mngh *l c* p 216. *Euastrum Crux Melitensis*, Ehr Infus p 162 tab 12 fig 3, Pritch Infus p 196 fig 124, Bailey, *l c* fig 23 and fig 29, young.

Amongst *Diatoma fenestratum* in a small pool a little below the outlet of Llyn Gwernan near Dolgelley: very rare.

This, which is a very beautiful plant, is much smaller than *Micrasterias rotata*, the segments are deeply divided into five nearly equal lobes which diverge from each other, and are all deeply bipartite, their divisions are linear, bidentate at the apex and also divergent.

The colouring matter is bright green and confined to the centre of the frond, the linear divisions of the lobes being colourless.

I have not seen the young fronds of this species, but their figure in Ehrenberg shows a difference from the perfect plant so much greater than in *Micrasterias rotata*, that it looks like a distinct species, and is in fact so considered in the 'American Bacillariæ'

PLATE VI fig 2 *Micrasterias Melitensis* perfect frond

## XXXII —*On the genus* Xiphophora, *and, in connexion with it, Observations on this question* *Do we find in the* Fucaceæ *the two Modes of Propagation which we observe in the* Florideæ? By Dr MONTAGNE*

### *Xiphophora*, Montgn , nov gen

Frons sterilis, ex qua surgit fertilis (seu receptaculum), dichotoma eaque brevior, compressa, flexuosa (en zigzag) apice truncata Pars maxima frondis in receptaculum planum, elongatum, dichotomum, papulosum olivaceo nigrum, apicibus incurvis ensiformibus insigne, abiens Conceptacula immersa, per totam frondem fertilem sparsa, globosa, poro pertusa, intus nucleum dimorphum foventia, in altero autem observantur sporæ obovatæ, luteo-brunneæ, limbo hyalino cinctæ, e cellulis parietalibus obortæ, paraphysibus gracilibus articulatis simplicibus concomitatæ, in altero vero fila adsunt ramosa, articulata, articulo extremo gemmam oblongam, granulosa repletam materie, tandem liberam et perisporio, ut sporæ genuinæ, vestitam includente Habitus *Fuci*, at receptaculum *Himanthaliæ* Nomen e *ξίφος*, ensis, et *φέρω*, fero compositum *Prodr nov Phycear in itin ad polum antarct* p 12 t 7 f 1

*Xiphophora Billardierii*, Montgn , l c

*Fucus gladiatus*, Labill , Pl Nov Holl t 256

*Obs* —M Hombron, principal surgeon of the Astrolabe, was the first to find the fructification of this Alga Previous to this discovery, the plant from its habit had been ranked among the species of the genus *Fucus*, where I would have left it, had it not previously happened that the *Fucus Loreus* was separated on grounds which ought to have the same value in the case of *F gladiatus*, Labill In all the known species of *Fucus*, the receptacle, elliptical or lanceolate, terminates the frond or the branches, from which it is altogether distinct Here we have, as in *Himanthalia*, a frond almost entirely converted into a receptacle, and in order to complete the resemblance, or at least the analogy, instead of a sort of fungiform body from which the receptacle originates, we find a frond very short, dichotomous, and remarkably distinct from the receptacle by its flexuose divisions abruptly truncated toward the summit But these are not the only differences by which we cannot fail to distinguish the new genus which I propose, either from *Fucus* or *Himanthalia*, there are others more profound and of a higher importance, since they occur in the fructification Thus, besides the frond being converted into a receptacle, that is to say, charged with conceptacles in the greater part of its extent, these last present two modifications in the organs which they contain In the one the normal spores spring regularly from the wall of the conceptacle, and are accompanied with filaments which are simple, very slender and jointed, without any dilatation of the terminal articulation, in a word, true paraphyses, in the others we find, instead of these, filaments also articulated but much branched, although limited to the cavity of the conceptacle, and in the terminal articulation of which the inclosed olivaceous granular matter becomes organized into an oblong body which increases in size, and finally separating from the filament, falls into the cavity of the cell like the true spores We find it then inclosed like these last in a perispore which is furnished to it by the tube of the filament, and its size comes to be equal to the third part of that of the normal spore

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* From the Annales des Sciences Naturelles for October 1842 Translated and communicated by Dr Dickie

The form and disposition of these organs reminded me of a number of observations which I have already made in analysing the Algæ of this tribe It appeared to me that it would be interesting to discover in what respect these two kinds of organs differ, and if they are different, to assign to each the functions intended by nature I have resolved therefore to submit to a new and scrupulous examination all the species of *Fucus*, and all the genera more nearly allied It is not without much diffidence in my own resources that I have ventured to enter upon a question surrounded with so many difficulties and scarcely alluded to by any botanist, I cannot, accordingly, pretend to have resolved it I shall be glad if the result of my researches, for which I claim their indulgence, should happen to awaken and fix on this question the attention of physiologists more favourably situated than I am for ascertaining the facts, if it be possible, by observation and direct experiment, and thus obtaining a solution of the great difficulties which it still offers

All botanists are aware that plants, even those which we call cellular, have two modes of propagation, the one by seeds or spores, the other by buds, gemmæ or propagines. These two kinds of organs, so evident in the *Hepaticæ*, are met with also in the *Florideæ*, a family still more closely approaching that to which *Xiphophora* belongs It has been completely established by experiments against which no doubts can be raised, that the sphærospores (*anthosperms*, Lamx ), or what we name the second fructification of the *Florideæ*, can, as well as the seeds of the conceptacular fructification, reproduce an individual similar to the parent plant. Such being the case, what difficulty can there be then in regarding as representatives of one of these two modes of propagation, the kind of gongylæ filled with a granular matter which terminate the branches of the jointed filaments which we meet with in the conceptacles *of all the Fucaceæ*, and which M. de la Pylaie has named *microphytes*, a name which I shall retain until we have finally determined the kind of functions which they fulfill?

I am well aware that no fact, no direct experiment can be produced in proof of this rather rash opinion, but which nevertheless seems to me worthy of examination. Long previous to our having recognised and verified their power of propagating the plant, we had considered the anthosperms of Lamouroux as one of the means of reproduction in the *Florideæ*,—anthosperms, which, under the name of sphærospores or tetraspores, are regarded at present as the normal fructification, whilst the conceptacular has fallen to the second rank, and is only considered by some phycologists as an anormal and succedaneous mode of propagation. However this may be, either I am much mistaken, or it appears to me that we may recognise these two modes of reproduction in the *Fucaceæ*, first, in the true spores, either fixed to the base of the paraphyses or to the wall of the conceptacle itself; second, in the microphytes of M. de la Pylaie, figured by Lyngbye (Hydroph. Dan. t. 1. B. figs. 3 and 4). These microphytes are most assuredly similar or at least analogous to many of the conceptacular fructifications which among the *Florideæ* are produced in the terminal articulation of a branched and jointed filament, which is usually, as in this case, a continuation of those which constitute the frond. Does not this resemblance between analogous organs in two neighbouring and parallel series appear to add some weight to the opinion held by M. Decaisne respecting the secondary importance of the conceptacular fructification? I confess that, previous to having these new ideas respecting their nature, I took for young spores the gongylæ which the microphytes bear. The error was so much more difficult to avoid, since many species appear destitute of true spores. In his general remarks on the *Fucaceæ*, M. Meneghini (Alghe Ital. e Dalmat.) himself appears to have considered as normal spores the gemmæ which are borne by the branched filaments of the microphytes; in fact, he expresses himself as follows:—"Essi asci sono ramosi-articulati, alcuni sono fertili, portano cioè le spore, ciascuna delle quali è solitaria in uno degli articoli terminali, gli altri," &c.

We now proceed to the observations, which to a certain extent support my ideas respecting the organs in question.

In one species of *Marginaria*, the *M Urvilliana*, I have found true spores, accompanied by paraphyses almost simple, jointed, and not inflated at the extremity, the other, *M Boryana*, in more than twenty receptacles thoroughly examined, has only presented microphytes, very much branched, jointed, and having the terminal articulation of the branches dilated into a spore or gemma, if we prefer this last name, which, becoming detached from the filament, falls into the middle of the conceptacle enveloped by the membrane of the tube in the form of a perispore

In the *Scytothalia Jacquinotii* I have seen normal spores, accompanied by paraphyses almost simple, moniliform, and transparent

It would appear from my researches, which unfortunately I have not been able to follow out in a sufficient number of individuals, that in *Himanthalia* the two sorts of filaments, in place of occurring on the same receptacle and in different conceptacles, as in the genus *Xiphophora*, are met with on different individuals On four specimens analysed by me, two had the normal fructification, which we call *basispermal*, the others only presented microphytes, to which we may also apply the name *acrosperms*, to distinguish them from the first, although I freely confess that there exist intermediate forms which will render these denominations somewhat vague I state what I have seen in the examples of *Himanthalia* in my possession, but I am far from affirming that such is always the case I would very much recommend the verification of this point to such botanists as may have opportunity of doing so

The *Fucus vesiculosus*, of which I have only examined three individuals, has invariably shown the basispermal fructification

In *F ceranoides* these are absent, or at least I have only seen one sort of filaments; these are microphytes

Lyngbye figures the two kinds of filaments and of fructification in *F serratus*, now on more than ten individuals which I have examined (it must be acknowledged in a dried state) I have only met with the microphytes of the preceding species, differing from them only a little in shape

As certain *Florideæ* present the two modes of propagation united on the same stem but not confounded together, we also find in *Fucus canaliculatus*, inclosed in the same conceptacle, the filaments of the two kinds, that is to say, the basi- and acrospermal fructification

It is nearly the same with *F distichus*, in it we observe all the transitions from true spores to what we may consider as gemmæ or propagines

Lastly, in a great number of examples of *F nodosus*, L (*Halidrys nodosa*, Lyngb ), I have only observed microphytes, and what is very remarkable, M. de la Pylaie, who has analysed on the spot at Terre Neuve a great number of individuals of this same species, has never, more than myself, met with the other form of fructification. Nevertheless, Lyngbye has represented the basispermal fructification of this species, and Turner (Hist. Fuc. t. 98) says even positively that in it he has seen the two sorts of filaments in the same conceptacle, and what is more, he represents them in such a way that one cannot fail to recognise them.

Such are the facts on which I found my opinion respecting the two modes of propagation in the *Fucaceæ*. I shall not conceal their insufficiency, for I freely acknowledge that they want the sanction of experience. Nevertheless, the subject appears to me to merit the attention of naturalists at a time when the Algæ have been made the subjects of so many important researches.

Some time ago M. M. Crouan (An. Sc. Nat. xix. p. 250) had spoken of the double fructification of *Himanthalia*, and more recently M. J. Agardh (Alg. Medit. et Adriat. p. 45) has agitated this same question, which had occupied my attention long ago, by expressing it under the form of a doubt. For example, he says, "Alter fructificationis forma in filis receptaculorum forsan adest, licet hoc experimentis directis nondum probatum fuerit." The opinion of the celebrated Swedish phycologist, although stated with such reserve, appears to me to give some value to that which I have been attempting to sustain in this short notice. Whatever judgement may be passed on this, I shall persist in believing that there is in this matter something more than has been hitherto recognised, and that it is a subject of research which interests in a high degree the science of Algology.

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## XXXIII.—*Further Observations on* Ctenodus Labillardieri. By C. Montagne, D.M., *in a Letter to the* Rev. M. J. Berkeley, M.A., F.L.S.

My dear Friend,

You doubtless recollect that some time since you communicated to one of your Botanical Journals some observations which I had addressed to you in the course of our correspondence upon the fructification of the new genus *Ctenodus*. You will recollect too that I begged you to procure for me if possible a single fruit of the specimen figured in the excellent work of Turner, for I could not persuade myself that so excellent an observer could have seen but one cell where I had seen twenty. It appeared then more than probable that the singular fructification which I have published, and which had also been observed by Mr. Harvey, was not the conceptacular form figured in the 'Historia Fucorum.' A recent communication from Mr Harvey, has proved the truth of my suspicion, and I take the earliest opportunity of informing you of it, that you may be so kind as to complete the communication relative to the very curious fructification of *Fucus Labillardieri* which you made on a former occasion This fructification has the same external appearance as the other, and it is only on analysis that we find, that instead of a considerable number of cells it has but one, which opens by a pore at the summit Among the admirable figures in Kutzing's work, I do not find one capable of giving you an idea of it, or I should be content with merely citing it I am going then to describe it as briefly as I can From a central axillary placenta a tuft of branched articulated filaments arises in the form of a wheat-sheaf, whose coloured endochromes are rather longer than broad Their tint is faint below, but as they approach the summit of the tuft, the colour becomes brighter and more purple These are the last joints of the filaments in question, whose endochromes become the spores They are in form oblong, resembling somewhat that of grape-stones Measured by the micrometer their length is from one to two centièmes of a millimetre, and their breadth from the two-hundredth to the hundredth of a millimetre They are of a beautiful purple and extremely numerous As they are formed at the summit of the filaments and occupy the upper part of the cavity, we have the explanation of the imperfect figure of Turner, incomplete I mean in this sense, that the structure of his microscope did not allow him to see the rest of the fructifying apparatus You see then that this fructification does not differ from that which we find in many other *Florideæ*, and that without its remarkable tetrasporic fruit it would not form a distinct genus You will moreover observe that I was not deceived in my anticipations, since chance has procured me the knowledge of the other mode of reproduction, of whose existence I felt sure from analogy I received a day or two since a letter from M Zanardini, a well-known phycologist of Venice, in answer to my communication relative to *Ctenodus* you will see by the terms of his letter which I am going to translate, that the specimen which he possesses of *Fucus Labillardieri* has the conceptacular fruit "I have examined attentively," he says, "your recent labours on the genus *Ctenodus* M Diesing has given me a magnificent specimen of this Alga I have subjected to a scrupulous examination many capsules, and I have felt vexed at not being able to observe the facts which your figures represent, either as regards the plurality of cells, or the centripetal direction of the organs of fructification " It is clear, since he could not observe them, that M Zanardini had before him, not the form figured by me, but the conceptacular form illustrated by Turner

I do not like to let this opportunity escape of apprising you of another conceptacular fructification not less remarkable, and which must be very rare, since no one has hitherto described it. It is however that of one of our commonest Algæ, I mean *Gelidium corneum*. I think I showed you the analysis I had made on your late visit to Paris. In many dozens of individuals from different localities which exist in my herbarium, one only had conceptacular fruit; all the rest were either barren or had tetraspores. In his 'Algæ Mediterranei Maris,' M. J. Agardh excuses himself for not describing it, because, he says, he has not got it at hand. This fructification however deserves to be known, and I am going to endeavour to give you an idea of it, which I am sorry that I cannot accompany with a figure to make you understand it more easily.

The conceptacles of *Gelidium corneum*, which may be considered as the type of the genus, are developed in the ultimate pinnules which they terminate, so that the base of the pinnule forms a sort of peduncle, and the tip a mucro, which however is sometimes wanting. If by two parallel incisions made in the direction of the axis, one obtains a very thin slice of the centre of the conceptacle, and after carefully separating it from the lateral portions it is placed on the two plates of glass in Schiek's compressor, it appears under the microscope that the centre is traversed by a sort of columella. This, formed by the termination of the filaments which occupy the centre of the fronds and of the branches, in a word by the medullary tissue, presents in this respect a sort of analogy with the organ of the same name in the capsule of mosses. From all points of its circumference there proceed numerous short branches which bear at their tips a little group of cells of the most delicate tissue, and of such extreme transparence that one can see them only by varying the intensity of light by means of the diaphragms of the instrument. The cells in question, at first almost spherical (at least there are some of this form mixed with the rest), become gradually oblongo-claviform as they increase. It is in their cavity that the spores are developed, but there are a great number which remain barren and consequently transparent. The spores, which are pyriform and of a deep purple, are innumerable, and placed horizontally round the central columella, from whence they radiate towards the walls of the cell, and to which they remain for a long while fixed by their more slender extremity. This disposition calls to mind the unilocular capsule of some *Caryophylleæ*, traversed by a central placenta. I am only speaking as regards form. As the conceptacle has no natural aperture, at least in the individual before me, it appears probable that the spores are not dispersed till the decay of the plant.

I forgot to tell you, in order to complete my observations on

*Ctenodus*, that in a letter lately received, Mr Harvey tells me that at an advanced stage of growth, the receptacles of the individuals with tetrasporic fruit present a pore corresponding with each cell, by which the spores escape

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## XXXIV —*Description of a Fossil Molar Tooth of a* Mastodon *discovered by* Count Strzlecki *in Australia* By Prof OWEN, F R S

THE large fossil femur, transmitted to England in 1842 by Lieut - Col Sir T L Mitchell, Surveyor-General of Australia, from the alluvial or tertiary deposits of Darling Downs, and described in the 'Annals of Natural History' for January 1843, p 8 fig 1, gave the first indication of the former existence of a large Mastodontoid quadruped in Australia

The portion of tooth described and figured in the same communication (p 9 figs 2 and 3), presenting characters very like those of the molars of both the *Mastodon giganteus* as well as of the *Dinotherium*, and being from the same stratum and locality as the femur with which it was transmitted, was regarded by me as having most probably belonged to the same animal, and, on the authority of drawings subsequently received from Sir T Mitchell, was referred to the genus *Dinotherium**

Having since received specimens of portions of lower jaws with teeth identical in structure with the fragment figured in my first communication to the 'Annals' (p 9 figs 2 and 3), I find that the reference of that portion of tooth to the genus *Dinotherium* was premature and erroneous The extinct species to which it belonged does, indeed, combine molar teeth like those of the *Dinotherium* with two large incisive tusks in the lower jaw, but these tusks incline upwards instead of bending downwards, and are identical in form and structure with the tusk from one of the bone-caves of Wellington Valley, described by me in Sir T Mitchell's 'Expeditions into the Interior of Australia,' vol ii 1838, p 362 pl 31 figs 1 and 2, as indicative of a new genus and species of gigantic marsupial animal†, to which I gave the name of *Diprotodon australis*

It is not my present object to describe these most interesting additional fossils of the *Diprotodon*, or to enter into the question whether the great femur before alluded to belonged, like the fragment of tooth transmitted with it, to the *Diprotodon*, or to a different and larger animal; but briefly to make known the more decisive evidence of the former existence of a large Mastodontoid quadruped in Australia, which is afforded by the tooth figured, on the scale of half an inch to one inch, in the subjoined cuts

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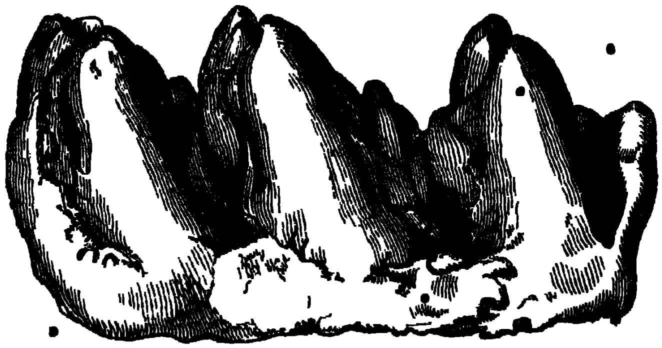
* Annals of Natural History, May 1843, p 329 fig 1

† See also my paper "On the Classification of Marsupialia," Zool Trans vol ii p 332, in which the *Diprotodon* is placed with the Wombat in the family '*Phascolomyidæ*

Fig 1

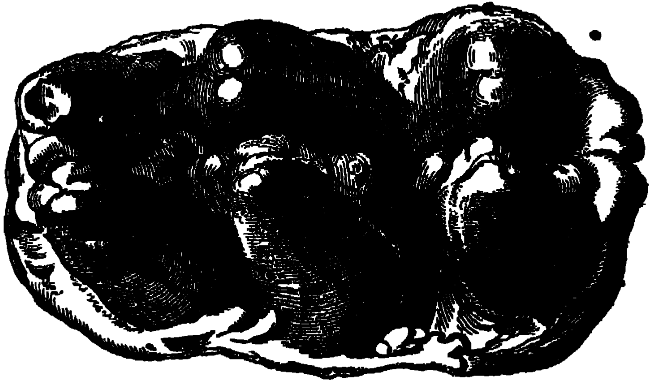


*Mastodon australis,* half nat size

If these figures be compared with those of the molar teeth of the *Mastodon angustidens,* reduced to the same scale, in Cuvier's 'Ossemens Fossiles,' 4to, vol i, 'Divers Mastodontes,' pl 2 fig 11, pl 3 fig 2, or with that of the more abraded molar, pl 1 fig 4, they will be seen to present a generic and almost specific identity

The close approximation of the Australian Mastodon to the *Mast angustidens* will be appreciated by a comparison of fig 1 with a similar direct side-view of an equally incompletely-formed molar given by Cuvier, *loc cit* pl 1 fig 1, but this tooth, being from a more posterior part of the jaw, has an additional pair of pyramidal eminences, and if the proportions of the figure of half an inch to an inch be accurate, the European tooth is rather smaller than the Australian fossil, notwithstanding its additional tubercles and more backward position in the jaw

Fig 2



*Mastodon australis,* half nat size

The Australian fossil tooth here described was brought by a native to Count Strzlecki, whilst that enterprising and accomplished traveller was exploring the ossiferous caves in Wellington

Valley The native stated that the fossil was taken out of a cave further in the interior than those of Wellington Valley, and which Count Strzlecki was deterred from exploring by the hostility of the tribe then in possession of the district With this circumstantial account, communicated to me by Count Strzlecki when he obligingly placed the fossil in my hands, and with the previous indication of a large Mastodontoid quadruped in the femur transmitted by Sir T Mitchell from Darling Downs, there seems no ground for scepticism as to the veritable Australian origin of the molar tooth in question, notwithstanding its close similarity with the *Mastodon angustidens* of the European tertiary strata It is partially mineralized and coated by the reddish ferruginous earth characteristic of the Australian fossils discovered in the Wellington ossiferous caves by Sir T Mitchell

The amount of difference between the Australian molar and those of the European *Mastodon angustidens*, though small, equals that by which the molars of the *Mastodon Andium* are distinguished from the molars of the *Mastodon angustidens*, and if species so nearly allied have left their remains in countries so remote as France and Peru, still more if the *Mastodon angustidens* or *longirostris* formerly existed, as has been affirmed, in North America, we need feel the less surprise at the discovery of a nearly allied species in the continent of Australia

The fossil in question is the crown of an incompletely formed molar, with the summits of its mastoid or udder-shaped eminences entire, its fangs undeveloped, and its base widely excavated by the unclosed pulp-cavity It supports six principal mastoid eminences in three transverse pairs, with a narrow ridge at the anterior part of the base of the crown, and a small quadrituberculate talon or basal prominence posteriorly the three transverse eminences are joined together by a pair of small tubercles at the basal half of each interspace, placed in the long axis of the crown, and rather to the outer side of the middle line of the grinding surface, fig 2

The length or antero-posterior diameter of the crown is four inches ten lines the breadth of the posterior pair of tubercles is two inches eleven lines the height of the middle eminences from the base of the crown is two inches six lines the tooth is apparently the fourth molar of the left side of the lower jaw In comparison with a corresponding molar in the same state of growth of the *Mastodon longirostris** of Kaup, a cast of which is now before me, the Australian molar differs in having the principal transverse eminences more compressed antero-posteriorly in proportion to their height, and tapering to sharper summits, which however are obtuse and bifid The breadth of the tooth slightly increases to the posterior pair of eminences, whilst in the *Mastodon longirostris* and *angustidens* the crown maintains the same breadth, or more commonly becomes narrower from the anterior to the posterior pair of mastoid eminences

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* If this species be distinct from the *Mast angustidens* of Cuvier, the molar teeth seem to me to offer precisely the same characters

Other differences observable on a minute comparison are too trivial to deserve notice, especially when observed in only a single example of a complex molar tooth In the Australian specimen under consideration the mastodontal characters are unmistakeable, and the resemblance to the molar teeth of the *Mastodon angustidens* is very close The specific distinction of the Australian Mastodon rests, at present, only on the slight differences pointed out in the form of the mastoid eminences and the contour of the crown of the molar tooth

The question may arise, whether identity of generic characters in the molar teeth of an extinct Australian mammal with those of the *Mastodon* can support the inference that the remaining organization of the Proboscidian Pachyderm coexisted with such a form of tooth? The analogy of the close mutual similarity which exists in the molar teeth of the Tapir, Dinothere, Manatee and Kangaroo suggests the surmise that the mastodontal type of molar teeth might also have been repeated in a gigantic Marsupial genus which has now become extinct, and such an idea naturally arose in my mind after having received evidence of the marsupial character of the *Diprotodon* and *Nototherium* *, two extinct Australian genera, with the tapiroid type of molars, represented by species as large as a Rhinoceros

The more complex character of the molars of the *Mastodon*, and the restriction of that character, so far as is now known, to that genus only, makes it much more probable, however, that the molar here described belonged to a true *Mastodon*, and the species may be provisionally termed *Mastodon australis*

London, August 22, 1844

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## XXXV —*An Attempt to Classify the* Tetrabranchiate Cephalopods By William King, Curator of the Museum of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne

The following observations on the Tetrabranchiate Cephalopods are in substance the same as some which formed part of two lectures which I delivered in the autumn of 1841 in the Theatre of the Literary and Philosophical Society of Newcastle-upon-Tyne

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* The characters of these genera and the evidences of their marsupial nature will be the subject of a future communication

It will be seen that these shells are classified not only according to their agreement with each other in general character, but also in accordance with their relative order of creation The synopsis at the end will make this mode of classification intelligible at one view

In a paper which I read at a meeting of the Natural History Society of Northumberland, &c in March 1843, on the family *Unionidæ*, the following view was advanced —"I would again urge attention to the two elements which are necessary to be attended to in classifying any section of the animal kingdom, namely, *agreement of structural character* and *relative order of creation* If all animated forms had been produced at the same time, and there had been no previous dying out of these forms, the plan that is generally adopted in arranging a zoological group, that is, by attending to structural resemblances alone, would be perfectly admissible, but as innumerable species (for the most part extinct) have succeeded each other during former periods of the world's history, it follows, that to introduce such species in a natural classification, without any reference to their order of creation, would be equivalent to constructing a genealogical chart without attending to the relative period of the different families" Entertaining this view, it may be readily conceived that I read with considerable interest the Chevalier Agassiz's observations, which have recently appeared, on the classification of Fishes, and especially the following remark —"It will not be sufficient henceforwards to group genera and species according to their organic affinities, we must also take into account the relative age of their appearance on the surface of the globe, and the importance of each group in the different epochs of the general development, in a word, zoology ought to comprehend in its systems the genealogy of the whole animal kingdom*"

The Cephalopods have been divided into two sections, depending on their having two or four gills, those with two gills are termed Dibranchians, and such as have four are called Tetrabranchians This is Prof Owen's arrangement and nomenclature The Calamary, Cuttle-fish, Argonaut, and Spirula are examples of the dibranchiate, and the Pearly Nautilus represents the tetrabranchiate section

The Dibranchians are extremely common at present, as yet, we have no evidence that they lived during any portion of the primary period, but from the abundance of their remains in the corresponding rocks, it is certain that the secondary seas sustained them in incredible numbers The Tetrabranchians appear to have existed at an early period of organic time, and the occurring of their testaceous coverings in every subsequent deposit, together with their still inhabiting the Southern Ocean, prove that they have survived to the present day

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* Vide a translation of this paper in the last number (73) of the 'New Edinburgh Philosophical Journal

If we examine a specimen of the Pearly Nautilus which has been longitudinally divided, its inner part will be seen to consist of a number of cells or chambers, the partitions or dividing plates of which have a small tubular perforation in the centre The animal or mollusk which inhabits this shell is, allowing for some important differences, allied to that which tenants an ordinary univalve it occupies the outermost chamber, but a portion of its enveloping tegument or mantle, in the shape of a slender membranous tube or siphon, accompanied with a vein and an artery, passes through the whole of the chambers by means of the tubular perforations* This tube may be one means of keeping the animal fixed in its place, but the principal seem to be two muscles, one on each side of the body, which are connected with the lateral walls of the chamber

It is generally supposed that the chambers constitute "an apparatus which renders the Nautilus nearly of the same specific gravity as the surrounding water, and enables it to rise to the surface of the sea, or sink to the bottom, simply by altering the extent of the surface exposed to the water by its soft parts†"

Now the Ammonite or snake-stone, as it is popularly called, is a shell which is constructed on the same general plan as the Pearly Nautilus, and which it is generally admitted was fabricated by a cephalopodous mollusk‡ Specimens of the Ammonite are quite common which show distinctly their inner part divided in the same manner as the Nautilus, but in each of these genera the siphonal sheath is differently placed, and the plates have a different form In the Ammonite the siphonal sheath is in contact with the outer or dorsal part of the shell, whereas it is central or nearly so in the Nautilus and the edge of the plates, instead of being plain and slightly sinuous, as in the last genus, alter-

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[*] The siphon appears to have been strongly protected in some fossil Nautiluses both by an elongation of the tubular perforation and by additional calcareous tubes (*N sipho* and *N striatus*, Buckland in 'Bridgewater Treatise ) These parts, whether only one or both are known to occur in a fossil, will be considered in the light of a *siphonal sheath*, and as such will be termed in the following pages

[†] In my lecture, as it was originally delivered, Dr Buckland s hypothesis respecting the use of the siphon was examined This hypothesis having been shown to be untenable by the researches of Prof Owen (vide Hunterian Lectures on the Invertebrate Animals), I have thought it necessary to cancel my original remarks, and to replace them by the above extract from Dr Mantell s highly interesting 'Medals of Creation '

[‡] The Ammonites, and all the other shells mentioned in this paper, are placed in the tetrabranchiate division of the Cephalopods, in accordance with the views of Prof Owen

nately curves before and behind a line corresponding to the plane of the centre of the plates, so that allowing this line to pass through a series of curves, the edge may be said to be divided into an anterior and a posterior set of lobes, which are either simple or compound, according to species, further, these lobes, throughout their whole contour, are set off with numerous pointed digitations, which are invariably directed backwards, that is, towards the origin of the whorls. These digitations, Dr Buckland observes, may have served as holdfasts, by which the posterior part of the animal's mantle could fix itself firmly, and as it were take root around the bottom of the outer chamber

The remains of both these divisions of the Tetrabranchians are common to certain of the secondary rocks In the Silurian portion of the primary period a great many of the then existing cephalopodous shells possessed plain-edge plates, and thus they agreed so far with the Nautilus, but strictly speaking, their siphonal sheath cannot be said to be central, since it is often situated within and at a distance more or less from either the outer or the inner margin of the plates

These early cephalopodous shells arrest our attention by the variety of shapes which they have assumed They may be said to run into every conceivable form from a close coil to a straight line The straight ones have received the name of *Orthocerus*, those which are curved are called *Cyrthocerus*, and such as are tendril-shaped or open-coiled have been termed *Gyrocerus* these last appear to be closely allied to some whose coils are in contact with each other, and for which may be used the provisional name *Discus** again, these conduct us to a shell which is close-coiled when young, but afterwards it strikes off at a tangent this is Montfort's genus *Lituites* Besides these, several other kinds have been described and otherwise named

It has been observed, that in a great many of the Silurian Cephalopods the siphonal sheath oscillated as it were between the outer and the inner edge of the plates without touching either Along with these there existed others somewhat different, inasmuch as the edge of their plates is more or less sinuous, and their siphonal sheath is placed in some on the outer, and in others on the inner margin of the plates these constitute the genera *Goniatites* and *Clymenia*

Now it is a remarkable fact, that in whichever genus of the tetrabranchiate Cephalopods we find the edge of the plates undulated, we in general observe the siphonal sheath approximating to the dorsal or to the ventral aspect of the shell Hence we have no difficulty in graduating the Discus with its simple plates and oscillating siphonal sheath, either into the Goniatite or the Clymenia

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* Sowerby, in the 'Mineral Conchology,' has applied Montfort's name *Ellipsolithes* to these shells (compare generically *E funatus*, tab 32, with *Nautilus undosus* of the 'Silurian System'), which cannot be allowed, since Montfort's genus was founded on a species of *Ammonites* from the Chalk near Rouen

From the close-coiled *Discus* to the straight *Orthocerus*, our passage is with as little difficulty effected through the genera *Gyrocerus* and *Cyrthocerus*

Thus the Silurian period has furnished us with various cephalopodous forms, which, notwithstanding their dissimilarity, may be linked together in perfect harmony We shall now endeavour to connect them with some of the same class which have since sustained their part throughout the various organic revolutions of our globe

In passing from the Silurian to the Carboniferous period, most of the forms which have been mentioned accompany us, they deviate however more and more from their original types as we leave in the distance our starting-point thus most of the Carboniferous Goniatites differ from the simple-lobed species of the Silurian rocks in having the edge of their plates more complicated, and several of the Carboniferous Nautiluses are distinguishable from their Silurian prototypes, the Discuses, by their possessing the true conventional characters of the genus in which they have been placed

The Cephalopods with a ventral siphon, as the beautiful Clymenias, do not appear to have undergone any amount of change, nor do they seem to have long survived the epoch of their creation It is otherwise, however, with those which were furnished with a dorsal siphon they made their first appearance during the Silurian epoch, thence we are able to trace them through the whole series of stratified deposits to the Cretaceous* æra,—thus continuing throughout two immense geological periods, the primary and secondary During this range, the edge of their plates underwent a variety of modifications in the first instance, the plates had simple lobes, such as are displayed in the Silurian Goniatites, the crown of the dorsal and lateral posterior lobes, however, became divided or digitated in the Carboniferous species†, afterwards, for example, in the Triassic period, the divisions became decidedly more numerous, and even the sides of the posterior lobes which verge on the dorsal aspect of the shell assumed this character, as may be observed in the Ceratite[*], and subsequently, that is, throughout the Jurassic and Cretaceous epochs, the whole contour of the posterior, and also of the anterior lobes, became digitated, which is shown in the beautiful foliations of the Ammonite

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* The palæontologist, who is of opinion that we are *now acquainted with the fossils of every geological period*, may be disposed to question this assertion, and to dwell upon the absence of these shells in the Permian rocks

† The simple dorsal lobe of the early *Goniatites* is divided in most of the Carboniferous species, according to Vicomte d'Archiac and M de Verneuil the posterior lateral lobes which verge on the dorsal aspect of the shell are divided in *G mixolobus*, *G cyclobus* and *G Looneyi*, and in a species (———) from the western side of the Oural Mountains, specimens of which are in the Russian collection of the Newcastle Museum, the crown of all the lateral lobes is divided

It has been previously remarked that the plain-edge-plate Cephalopods or Nautilidians[†] of the primary period ran into a variety of shapes, from a close coil to a straight line,—a disposition which we never find displayed in the early Ammonidians[‡], as the Goniatites, nor in their successors, the Ceratites but no sooner do the Ammonites appear than they imitate the forms of their remote predecessors thus a certain section of the last disunites its coils and becomes the gyroceroid Criocerus[§], this before long completely unfolds itself, and thus we have the cyrthoceroid Ammonocerus[||], whose light and graceful arch is afterwards unbent to form the fragile orthoceroid Baculite But our list of changes still remains unexhausted another section of the Ammonites retains the normal form for a certain time, then strikes off its coil at a tangent to be afterwards curved back, and hence we have the Scaphite, and the Criocerus, as if conscious that it could improve this figure, assumes the more pleasing yet singular form of the Ancylocerus

But these forms are merely modifications of the shell unfolding its coils on one and the same plane Unlike the primary shells in this respect, certain of the Ammonidians are obliquely coiled or spiral, and the coils strike off from the slight deviation exhibited in the Jurassic *Turrilites Boblayei* to the extreme which is observable in the Cretaceous *T costatus*

The Turrilite is essentially an Ammonite having a spiral convolution, inasmuch as the coils, in both kinds, are in contact, but the last is not the only form that passes into a spirally coiled Cephalopod, since we find the evolute Criocerus *obliquating* its coils to become the Heliocerus

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[*] In none of the figures that I have seen of the Ceratite is the character particularized in the text represented it is displayed in a specimen belonging to the Newcastle Museum

[†] Family *Nautilidæ*

[‡] Family *Ammonidæ*

[§] According to Mr Morris (Catalogue of British Fossils) a species of *Criocerus* is found in the Kelloways rock, Wiltshire

[||] Lamarck's genus *Ammonocerus* is evidently the same as D'Orbigny's *Toxocerus*, which is of a later date D'Orbigny states that it is found in the Jurassic system, but does not mention in which division I found it in the Jurakalk near Streitberg, Franconia, in 1839 *Criocerus* must be found in an earlier, or at least an equivalent rock, before what is said in the text of *Ammonocerus* can be received, even as a sound metaphor

The development of so many genera of the foliate-plate cephalopodous shells at a time when they were about to disappear, would almost induce the notion that every form that could be assumed had been tried to perpetuate them but a grand organic change was to arrest their evolutions that change was to annihilate them,—and thus the eve of the secondary epoch, which had seen them luxuriating under every form, was destined to be a witness to the final struggles of the Ammonidians!

Let us now turn our attention to the Nautilidians It will be recollected that we left them revelling in the Carboniferous epoch under the forms of *Orthocerus*, *Cyrthocerus*, *Discus* and *Nautilus* With one exception, and at the close of this period, these forms became suddenly extinct, and even the excepted genus—the last, appears to have with difficulty escaped the fate of its congeners, since the deposits which were formed during the succeeding ages, the Permian and the Triassic, yield us but few species Afterwards the Nautilus seems to have completely recovered from the check which it had previously sustained, as the Jurassic and the Cretaceous rocks teem with new specific forms This state however did not continue, for the same devastating influences which overtook the Ammonidians encompassed the Nautiluses the first were destroyed and the last survived, but only to live in reduced numbers during the Tertiary epoch, and to be reduced still more in our own

Like the Ammonidians of the Jurassic and the Cretaceous period, some of the contemporaneous Nautiluses appear under characters somewhat different from those of their predecessors for example, the slightly sinuous edge which in general marks the plates of this genus is lobed in such species as *Nautilus sinuatus* and *N biangulatus*, the same character appears to have been preserved in *Nautilus Danicus*, and it would seem to have arrived at its maximum in the Tertiary *Nautilus sipho* and *N ziczac*

We have now traced the Tetrabranchiate Cephalopods throughout their entire existence We have observed them in one period abounding to excess, and in the next to become considerably reduced, then again to burst forth in countless numbers, and afterwards to become all but extinct

Shall we conclude that the existence of but two species in the present seas indicates an approximating termination to their career? A knowledge of their past history ought to make us pause before we adopt this conclusion, for what have we to oppose their re-entering another Jurassic period?—their again appearing in a thousand forms?—in short, what have we to disprove, that they are still destined to sustain an important part in the future zoological revolutions of our globe?

The principal genera of the Tetrabranchiate Cephalopods classified according to their agreement in general character and chronological appearance

| Primary Period | | | | Secondary Period | | | Tertiary Period | Quaternary Period |
|---|---|---|---|---|---|---|---|---|
| Silurian Epoch | Devonian Epoch | Carboniferous Epoch | Permian Epoch | Triassic Epoch | Jurassic Epoch | Cretaceous Epoch | | |
| Orthocerus | Orthocerus | Orthocerus | Orthocerus? | Orthocerus? | Orthocerus? | | | |
| Cyrthocerus | Cyrthocerus | Cyrthocerus | | | | | | |
| Gyrocerus | Gyrocerus<br>Clymenia | Clymenia? | | | | | | |
| Discus. | Discus | Discus | | | | | | |
| Lituites | | | | | | | | |
| | | Nautilus | Nautilus | Nautilus | Nautilus | Nautilus | Nautilus | Nautilus |
| Simple Goniatites. | Simple Goniatites | Simple Goniatites. | | | Lobed Nautilus | Lobed Nautilus | Lobed Nautilus | |
| | | Digitated Goniatites | Digitated Goniatites? | Digitated Goniatites? | Digitated Goniatites? | | | |
| | | | | | Ancylocerus | Ancylocerus<br>Baculites | | |
| | | | | | Ammonocerus | Ammonocerus | | |
| | | | | | Criocerus | Criocerus | | |
| | | | | Ceratites | Ceratites? | | | |
| | | | | | Ammonites | Ammonites | | |
| | | | | | Turrilites | Scaphites<br>Turrilites | | |
| | | | | | Heliocerus | Heliocerus | | |

## *Notes connected with the Synoptical Table*

I have drawn up the foregoing Table without having seen that which accompanies Agassiz s paper, the translation in Professor Jamieson's Journal is all that I have seen at present

It must be understood, that I offer this classification of the Tetrabranchiate Cephalopods only as an approximate one It is for the principles of such a classification that I contend The genera *Orthocerus Ceratites* and *Goniatites* have been carried up into the Jurassic epoch, because they have been found in the St Cassian (Tyrol) beds, associated with Ammonites and other fossils of this age

If the Ceratites are of the epoch mentioned in the last note, and the Ammonites did not exist previously, it follows that the latter must be connected with the former, as represented in the Table

I confess that I have little faith respecting the Ammonites having died out at the close of the secondary period In the case of many species and genera we find that although they have ceased to exist in our own seas, they are still to be found living in other latitudes this fact leads me to think, that the Ammonites may have lived within the tropics during the deposition of the early tertiary beds of France and England In making this remark, I have in view the Ammonidians of Pondicherry and other places in India

The generic difference between the Russian *Goniatites* —— ? and *Ceratites nodosus* is so trifling, as to cause me to think that the last genus will yet be found as low down as the Permian or the Carboniferous series Fossils undoubtedly form a good character by which to enable the geologist to decide as to the age of a rock but it ought always to be borne in mind, that unless the relative position of such a rock to others whose general character is known can be fairly made out, the organic test should be received with due caution

I have placed the Scaphites in connexion with the Cretaceous Ammonites, it is probable however that they existed previously to the latter There is a Jurassic species of *Ammonites* (I do not know the specific name at present) which becomes contracted and irregular as it advances in age, perhaps it stands in the same relation to the true Scaphites as the Jurassic *Turrilites Valdani* does to the true Turrilites of the Chalk

The Table will show that I differ from D'Archiac and De Verneuil as regards *Nautilus sipho* and *N ziczac* being Clymenias (Trans Geol Soc vol vi p 328), and from Buckland and others respecting these lobed species forming the link between the Ammonites and the Nautiluses The way in which I have spoken of the Discuses in the lecture would imply that I consider them to form the original type of the Tetrabranchiate Cephalopods it seems preferable to wait until we know more of the early fauna of our planet before any positive opinion is hazarded on this point

## XXXVI —Generic characters of an undescribed Australian Fish

By JOHN RICHARDSON, M D, F R S &c, Medical Inspector of Naval Hospitals

*Forma* compressissima, circumscriptione laterali semiparabolica facie frontata oblique retro descendenti

*Os* parvum, rictu fere horizontali, parum declivi Maxilla inferior porosa cirris minimis parce prædita

*Dentes* minutissimi (microscopici), arenacei in maxillis utrisque, ossibusque pharyngeis stipati Lingua, vomer, palatumque læves

*Oculi* laterales in summa gena positi

*Ossa capitis operculorumque* inermia, sulcatim insculpta

*Os preorbitale* membro tenui verticali disco infero dilatato insculpto Catenula suborbitalis membranaceo tubulata, nec ossea, oculo remota, e disco preorbitalis ad tempora, genam transcurrens

*Apertura branchialis* ampla postice infraque etiam intra ramos maxillæ inferioris, ad mentum usque extensa, super operculum clausa

*Membrana branchiostega* superne apiculata, infra nec isthmo annexa nec cum pari suo conjugata, radiis sex sustenta

*Squamæ* nullæ Cutis lævissimus *Linea lateralis* postice summum dorsum attingens *Anus* medianus papilla nulla

*Pinnæ pectorales* satis magnæ, pauciradiatæ, humiles positione, forsitanque functione ventrales pinnas quæ desunt simulantes, radiis tenuibus, indivisis, articulatis

*Pinna dorsi* pinnam *Agriopi* referens, per totum dorsum ab extremo fronte ante oculos ad pinnam caudæ usque cui membrana connexa, regnans, radiis ejus et pinnis ani articulatis, attenuatis vix a radiis non articularibus oculo nudo dignoscendis

*Pinna ani* a pinna caudæ discreta Radii pinnæ caudæ indivisi, tenues articulati

*Obs* —Anatomia ignota Vertebræ circiter 35, quarum 18 ad caudam pertinentes Nescio an inter Gobiidis an cum Blenniidis recensendus sit *Patæcus* * In forma corporis pinnæque dorsi necnon in sculpturis ossium capitis analogiam *Agriopo* exhibet ut affinis ejus *Chænicthys* *Triglam* simulat

PATÆCUS FRONTO, species unica adhuc detecta

RAD —Br 6, D 24|16, A 11|5, C P 8

Icon. Zoology of the Voyage of the Erebus and Terror plate — ?

*Hab,* Southern Australia A specimen presented to the British Museum by Governor Gray

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* Th *παταικοί*, simulacra deorum Phœnicum in puppibus

## BIBLIOGRAPHICAL NOTICES.

*Plantæ Javanicæ Rariores, descriptæ iconibusque illustratæ, quas in Insula Java, annis* 1802—1818, *legit et investigavit* THOMAS HORSFIELD, M.D., *e siccis descriptiones et characteres plurimarum elaboravit* JOANNES J. BENNETT, *observationes structuram et affinitates præsertim respicientes passim adjecit* ROBERTUS BROWN. Londini, apud H. Allen et socios. Part 2 and 3.

WE must refer (vol. ii. pp. 214, 294) to our notice of the first number of this important work for some observations elicited from us by our high respect for Dr. Horsfield, and by our sense of gratitude to the Board of Directors of the East India Company for the liberal spirit with which they have uniformly encouraged the scientific and literary labours of the distinguished men who have had the good fortune to serve under them in the East, and who for the last half century especially have reflected so much honour upon the service in which they have been employed.

Among these eminent men no one stands more prominent for profound attainments in natural science than Dr. Horsfield, and it is deeply to be lamented that the little encouragement given by the public to works like the present, profound and accurate in research and beautifully illustrated, deprives us of the hope of his indefatigable labours and vast collections being adequately appreciated, except by those who consult the Museum of the East India Company.

The two parts of Dr. Horsfield's work now before us would have been noticed earlier, but from an expectation that we should have had ere this the entire work. But the accuracy which distinguishes all his publications has led to an inevitable delay in the completion of the present one, and we can no longer hesitate to lay before our readers a brief analysis of the portion which has appeared since our first notice.

We hailed the 'Plantæ Javanicæ Rariores' as one of the most important and interesting contributions made in this country to the cause of botany, important from the precious observations which it contained of Mr. Brown upon structure and affinities, and interesting to ourselves from the evidence it afforded of the talents of Mr. Bennett, on whom the labour has principally devolved. Attached as we are personally to that gentleman, not only for his sterling qualities of character, and for the courtesy with which he discharges his duties as Secretary of the Linnæan Society, and as Assistant in the Botanical Department of the British Museum, but also as the inheritor of that high and affectionate respect which we and a large circle of naturalists cherished towards his lamented brother, we hailed Dr. Horsfield's work with pride as affording such unquestionable evidence of Mr Bennett's claim to a high rank among botanists, and it is with no ordinary emotions of pleasure that we again observe in him that patient study and depth of observation which have so pre-eminently distinguished those remarkable men who have preceded him in connexion with the Banksian Herbarium. He has nobly acquitted himself in the present work of the public responsibility of his situation in our National Museum, and in hailing him as the pupil of Mr Brown, we cannot award him a higher meed of praise than by saying he is worthy of his intimate association with that great man.

No one aware of the zoological taste and labours of Dr Horsfield will be surprised at his seeking the assistance of Mr Bennett in the present work, for no one who has not made botany an exclusive study can, in the present advanced state of the science, do justice to collections, made, like Dr Horsfield's, between thirty and forty years ago. The determination and description of species has become in itself, to be faithfully done, an arduous undertaking, and how far the present work surpasses a mere detail of them and of genera we can only imperfectly attempt to show by the brief analysis we offer of it.

The two parts before us contain 20 plates and 134 pages of letter-press. A fourth part, with the five remaining plates, &c., will appear in a short time, completing the work. The figures, drawn by Mr Curtis, are admirable for their precision and elegance.

It is impossible, within the limits assigned to us, to do justice to many parts of the work. We would refer especially to the important observations on *Cyrtandrea* and the synopsis of its genera, on *Dialium*, &c. &c., and the elaborate article on *Pterocymbium* and its family, to show how thoroughly the respective subjects have been treated, not only with immediate reference to the plant itself, but the historical detail and the remarks on affinities, &c. which arise out of it. Such minute research, learning and accuracy, while they give a sterling and enduring value to Dr Horsfield's work, equally reflect credit upon the authors and their country, and whatever may be the sense of obligation which Dr Horsfield entertains for the generous patronage he has met with from the Directors of the East India Company, he may proudly refer to this admirable work, and to his splendid collections at the India House, for the honour he has reflected upon the Company by his scientific labours.

We resume our analysis with the twenty-fifth article, *Loxonia acuminata*, the plate of which was given in the first number, but the text reserved for the second. On the subject of this plant, Mr Brown enters into a detailed examination of the order *Cyrtandraceæ*, Jack, to which it belongs and of its affinities, and concludes by referring that order to *Gesneriaceæ*, of which he distinguishes three tribes, viz *Gesnerieæ*, *Beslerieæ* and *Cyrtandreæ* Of the latter he describes in detail the modifications of the several organs, and on the subject of the stigma, and the relations of its divisions to the parietal placentæ in the compound ovarium, adds that elaborate and highly important disquisition which we have published entire in our eleventh volume* A synopsis of the genera of this remarkable tribe is appended to the article, and is followed by the characters of the genera in greater detail, and of the sections into which they are divisible, with an enumeration of the species referable to them, and characters of many new ones

The next article relates to *Horsfieldia aculeata*, Bl, a genus named in honour of the excellent naturalist to whom we are indebted for the present work This is described by Mr Bennett as one of those anomalous genera of *Umbelliferæ*, which scarcely admit of being arranged in any of the existing tribes into which that order has been divided In many particulars it approaches *Araliaceæ*, and thus serves as an additional link of connexion between the families With reference to the *Araliaceæ*, the author corrects a mistake originating with Don and adopted by DeCandolle, according to which the seeds of that order are described as erect, while they are in reality pendulous as in *Umbelliferæ* The valvate æstivation of the corolla is more complete in *Horsfieldia* than in any other true *Umbellifera*

*Tristania obovata* is described by Mr Bennett as the only species of that genus that has yet been discovered beyond the limits of New Holland It approaches most nearly among described species to *Tristania laurina*

*Euonymus Javanicus*, Bl, belongs to that section of the genus in which the seeds continue to retain their original position with reference to the placenta The general rule, that the raphe properly belongs to that side of the ovulum which is next to the placenta, was first laid down by Mr Brown, who, at the same time, pointed out some remarkable exceptions In the case of certain species of *Euonymus*, however, he showed that the exception was confirmatory of the rule, the change taking place subsequent to the completion of the ovula by the resupination of the seeds M Adolphe Brongniart has since stated the exceptions to be numerous, and has instanced the families of *Rhamneæ* and *Ilicineæ*, but Mr Bennett, in the present article, shows that in those families also the raphe in the young ovulum is internal, although at a subsequent period it becomes external or lateral by a greater or less degree of torsion in the funiculus by which the ovulum is attached. The validity of the rule is thus most strongly confirmed by the cases of supposed exception.

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* See p 35

In the next article Mr Bennett establishes a new genus, to which he gives the name of *Stylodiscus*, on the *Andrachne trifoliata* of Roxburgh, a Euphorbiaceous tree extremely abundant throughout the east of Asia and the adjacent islands. It had escaped the author that this genus had been previously published in the 'Edinburgh New Philosophical Journal,' by Messrs Wight and Arnott, under the name of *Microelus*.

Of the subject of the thirtieth article, *Dialium Indum*, L., Mr Bennett gives a long historical notice, comparing the genus with *Arouna*, Aubl., and *Codarium*, Sol., with both of which it is most intimately connected. He does not hesitate to retain the union of *Arouna* with *Dialium*, proposed by Vahl and adopted by subsequent botanists, but he is inclined to regard *Codarium* as distinct on account of its rudimentary petal and the adherent stipes of its ovarium. On the latter subject he states that *Codarium* differs from all the other known genera of *Cæsalpineæ* in which the stipes of the ovarium is adherent to the tube of the calyx, by the adhesion taking place anteriorly and corresponding to the odd segment of the calyx and the outer margin of the fruit, while in all the other genera it is posterior, and corresponds with the suture of the legumen. Coincident with this difference there occurs a corresponding difference in the order of the reduction of the stamina, the two remaining stamina in *Codarium* being opposite to the two posterior segments of the calyx, while in the order generally, and especially among *Cæsalpineæ* with adherent stipites, it is usually the posterior stamina that are first lost or become abortive when an irregular reduction takes place. Attention is then directed to a character, which Mr Bennett states to have been several times pointed out to him by Mr Brown as affording strong indications of affinity, and consequently useful characters in a systematic point of view, in many of the genera of *Cæsalpineæ*, viz. the sculpture or appearance of sculpture on the surface of the seeds. Of the utility of this character numerous instances are adduced, and the article is concluded by an examination of the origin of the corneous mass which, in so many of the genera of *Cæsalpineæ*, performs the office of albumen.

Another Leguminous genus, to which Mr Bennett gives the name of *Euchresta*, is established on the *Andira Horsfieldii* of Leschenault. The distinction between this plant and the American genus to which it was previously referred is too striking to permit of their continued association, but *Andira* and *Euchresta*, together with *Geoffroya*, are nevertheless intimately connected. Mr Bennett discusses at some length their proper position among *Leguminosæ*, and comes to the conclusion that DeCandolle's tribe of *Geoffreæ* is utterly untenable from the heterogeneous character of the genera assembled under it. The same opinion has been expressed by the late lamented M. Vogel and by Mr. Bentham; and the latter has placed *Geoffroya* and *Andira* in a section of *Dalbergieæ*, distinguished by pendulous seeds and a straight embryo, an arrangement in which (with the addition of *Euchresta*) Mr. Bennett perfectly coincides. He does not, however, agree with Mr. Bentham in placing the genus *Brownea* among *Mimoseæ*, believing that it unquestionably belongs to a remarkable section of *Cæsalpineæ*, characterized by their abruptly pinnated leaves, the two conspicuous bracteæ enveloping the base of their calyx, and the adherence of the stipes of their pod posteriorly to its persistent tubular base.

A singular Hedysareous genus, to which Mr. Bennett has given the name of *Mecopus*, on account of the extreme length of the stipe of its pod, which far exceeds the length of the pod itself, forms the subject of the next article. It comes nearest to *Uraria* and *Eleiotis*, from both of which it differs in the character just indicated, and in the sudden retrofraction of the stipes at its base, by means of which the pod is immersed and the seeds entangled in the compact comose terminal heads which are seated, like so many diminutive birds' nests, at the extremity of its early denuded branches. The only known species, *Mecopus nidulans*, Benn., is *Uraria retrofracta* of Dr. Wallich's List, no. 5678. Mr. Bennett also characterizes another genus related to *Eleiotis* (to which the single species has been referred by Messrs. Wight and Arnott as *Eleiotis Rottleri*) under the name of *Oxydium*. The remainder of the article is devoted to an examination of the various and curious contrivances adopted in the different subdivisions of the Linnæan genus *Hedysarum* for the protection of the pod and its contents during their progress to maturity.

Of these contrivances *Phylacium bracteosum*, another new genus of *Hedysareæ*, and the subject of the following article, affords a remarkable instance. In this curious plant the subtending bracteæ of the floriferous pedicels enlarge very greatly at the time of flowering and during the progress of the fruit to maturity, and at the same time their stipes or petiole bends upwards, while the pedicel of the flower curves downwards. By means of these mutual displacements the flower is brought into relation with the under surface of the bractea, which then folds backwards along its midrib, bringing its margins into contact with each other, and thus forms a compressed cucullate bag for the protection of the flower and fruit. At the period of maturity these enveloping bracteæ readily fall off together with their contents, and doubtless contribute much by their levity to the dispersion of the seeds. Mr. Bennett compares this singular œconomy with that of *Fle-*

*mingia strobilifera*, of *Zornia*, and of *Geissaspis*, and points out the curious modifications which occur in each in the origin of their bracteæ and in the mode of their application to the protection of the fruit. *Phylacium* differs from all other Hedysareous genera in its climbing habit, by means of which, as well as in some other characters, it approaches *Phaseoleæ*.

*Parochetus maculatus*, the subject of article thirty-four, is a pretty species of a Papilionaceous genus founded by Buchanan Hamilton, and described in Don's 'Prodromus Floræ Nepalensis,' the immediate affinities of which do not appear to have been yet satisfactorily made out.

*Saccopetalum Horsfieldii* is described by Mr. Bennett as constituting a new genus of *Annonaceæ*, and forming with *Miliusa*, Lesch., and *Hyalostemma*, Wall., part of a well-marked tribe of that family, characterized by its 3-sepalous calyx, with the three petals of the outer series free and sepaloid, and the three of the inner series cohering valvularly at their edges, the cohesion being so complete and continuing to so late a period as to have induced M. A. DeCandolle and Dr. Wallich to describe *Miliusa* and *Hyalostemma* as gamopetalous. These genera are compared with *Saccopetalum* in reference to their more important organs, and various particulars of structure in other genera of the family are discussed with reference to their arrangement, distinction and relations with each other.

In the two succeeding articles Mr. Bennett describes two species of the genus *Saurauja* of Willdenow, *S. bracteosa*, DC., and *S. Blumiana*. On the subject of these plants he enters into an examination of their claim to be placed in the family of *Ternstrœmiaceæ*, which (notwithstanding their wide discrepancy from *Ternstrœmia* itself) he is constrained to admit. He calls attention to a remarkable tubular prolongation of the endostome, or that portion of the inner membrane of the seed surrounding its aperture, which fills up the aperture of the testa like a cork in *Saurauja* and other Ternstrœmiaceous genera, and particularly notices the great abundance of acicular crystals or raphides produced between the testa and the inner membrane in *Saurauja*.

The thirty-eighth article has for its subject a very pretty genus of the order *Meliaceæ*, to which Dr. Wight has given the name of *Munronia*. The species here figured is described by Mr. Bennett as the *Munronia Javanica*. One of the plants belonging to this genus was described and figured by Dr. Wallich under the name of *Turræa pinnata*, and this gives occasion to Mr. Bennett to enter at length upon the history of the genus *Turræa*, to examine its characters, comparatively with those of *Munronia*, and to give a synopsis of the two genera, with descriptions of several new species. These genera, together with a nearly related genus from New Holland named by Mr Brown *Leptophragma*, and with *Quivisia*, *Sandoricum* and *Mallea*, deviate from the ordinary relation of parts in having the cells of their ovarium (and consequently their compound central placentæ) opposite to the divisions of the calyx, and not (as in the great majority of *Dicotyledones*, when the number of parts is equal) opposite to the petals. But the ordinary relation recurs in *Melia* and in the entire family of *Cedreleæ*, or at least in all the isomerous genera of that family which Mr Bennett has had the opportunity of examining.

"In some cases," he remarks, "(as for instance in *Hypericinæ*,) this modification appears to be of ordinal value, but in the present instance, and in *Campanulaceæ*, it is only generic, and in a very remarkable case (*Leptospermum*) pointed out to me by Mr Brown, both modifications occur in the same genus. The last-mentioned case is more especially deserving of notice, inasmuch as *Leptospermum* is only distinguishable from another genus of the same family (*Fabricia*) by the latter possessing the full complement of cells of the ovarium (that is to say, a number equal to the divisions both of calyx and corolla), and thus combining both modifications in one. In *Turræa* we have a somewhat analogous instance, some of the species having an ovarium consisting of ten cells, or even, according to M. Ad. de Jussieu, of more."

*Phoberos* of Loureiro, and a species of that genus called by Mr Bennett *Phoberos Rhinanthera*, as having been formed into a genus by Dr Blume under the name of *Rhinanthera*, are the subject of the following article. Mr Bennett gives a detailed history of the genus *Phoberos*, and of others with which it has from time to time been confounded, and enters into an examination of the characters and limits of the family of *Flacourtianeæ* to which it belongs, and of *Bixineæ*, nearly all the genera referred to which he agrees with M. A. Richard and M. Kunth in uniting to *Flacourtianea*. He doubts the existence in any genus of the family of that remarkable reticular attachment of the seeds over the entire surface of the cavity of the pericarp, which in the character given by DeCandolle is attributed to the whole family. He believes that *Kuhlia* of Prof. Kunth is not sufficiently distinct from *Azara*, that *Ascra*, Schott, is not essentially different from *Trilix*, L., and that both should be compared with *Banara* and *Prockia*, that *Dasyanthera*, Presl, is not distinct from *Phoberos*, and that *Christannia salicifolia* of the same author is identical with *Pineda incana* of Ruiz and Pavon. Among published genera he rejects from the family *Ryania*, including *Patrisia* (which Mr Brown has shown to belong to *Passifloreæ*, to which *Erythrospermum* also makes a near approach), *Kiggelaria*, *Melicytus*, *Hydnocarpus*, *Mayna*, Raddi (the two latter, together with *Gynocardia*, Roxb., forming part of a new family indicated by Mr Brown and established by Dr Blume under the name of *Pangieæ*), and *Piparea*, Aubl. (long since determined by Mr Brown not to be distinct from *Alsodeia*), and adds to it, on the authority of Mr Brown, *Xylosma*, Forst., of which, as well as of *Banara* and *Prockia*, he gives an amended character. *Prockia serrata*, Willd., described by Swartz under the name of *Lightfootia* (a name preoccupied by L'Héritier), he characterizes under the name of *Thiodia*, and for the *Prockia integrifolia* and *Prockia theæformis* of Willdenow, he adopts as a generic name the sectional name *Aphloia* proposed by DeCandolle. To these species, which are widely distinct from *Prockia*, M. Achille Richard gave about the same time the generic name of *Neumannia*.

The last article of the second part relates to a curious and in some respects anomalous genus established by Dr Blume under the name of *Polyosma*, and by him referred to *Caprifoliaceæ*, but afterwards placed by DeCandolle in his newly established family of *Corneæ*. Between this family and another previously established by DeCandolle under the name of *Alangieæ*, Mr Bennett believes the relation to be so intimate, that not even an artificial distinction can be made between them. He compares *Polyosma* with *Cornus*, *Marlea* and *Alangium*, and calls particular attention to the remarkable changes that take place in the ovarium of *Polyosma* while the fruit is advancing to maturity, that organ being unilocular, and in the young state furnished with two parietal placentæ, each supporting an indefinite number of ovules, which are speedily reduced to a single ascending ovulum with copious albumen and a superior radicle. Mr Bennett confesses his inability to reconcile these anomalies with the structure of *Corneæ*, but states that he is "indebted to Mr Brown for directing his attention to another family, with the characters of which, previous to the changes that take place in the ovarium after impregnation, it fully agrees, and to which, especially as regards the structure of ovarium, a point of great importance, it is certainly much more nearly related than to *Corneæ*. Mr Brown proposes therefore to append *Polyosma* to *Escallonieæ*, notwithstanding its fruit reduced to a single seed, the large size of that seed, and the increased proportion and firmer consistence of its albumen. This approximation receives some confirmation from its resemblance in habit to *Anopterus*, a genus strictly referable to that family." The characters of six species of the genus are given, three of them being from Java, one from the hills adjoining Sylhet, one from Singapore, and one from New South Wales.

The forty-first article, commencing the third part, has for its subject a Javanese genus nearly related to *Brucea*, and called *Picrasma* by Dr Blume. Mr Bennett points out the differences between this genus and *Brucea*, and adds to it a Nepaulese species doubtfully referred to *Brucea* in Dr Wallich's List. He regards also as belonging to *Picrasma*, but forming a subgenus, *Nima quassioides* of Buchanan Hamilton, which Don had referred to *Simaba*. He notices several plants that have been from time to time regarded as either actually belonging to *Brucea*, or at least as very intimately related to it. Of these *Lepta* and *Tetradium*, two obscure genera of Loureiro, which have been singularly bandied about by systematic writers, are proved, by the examination of specimens from Loureiro himself, to belong to *Xanthoxylum*, including in that genus *Fagara*, as proposed by M. Kunth. *Xanthoxylum Clava Herculis* of Loureiro (not of Linnæus) is shown on the same authority to belong to a genus distinguished from *Xanthoxylum* by the want of sterile stamina in its female flowers, and its subsessile peltate stigma surmounting two collaterally biovulate ovaria. *Ailantus gracilis* of Salisbury, referred by DeCandolle to *Brucea*, is proved by a specimen from Salisbury himself not to be distinct from *Brucea Sumatrana*, Roxb. With regard to the position of *Brucea* and *Picrasma* in the natural system, Mr Bennett ventures doubtfully to suggest their approximation to *Simarubeæ*, but professes himself far from satisfied with respect to their real affinities.

*Lasiolepis paucijuga*, together with a second species, *L. multijuga*, collected by Mr Cuming in the island of Mindanao, form a new genus, which appears to Mr Bennett to be closely related to *Harrisonia*, R. Br., and to have no other near affinity. These two genera are also, as M. Adr. de Jussieu has already observed of *Harrisonia*, most nearly related to *Simarubeæ*, although not so closely as to admit of their being absolutely referred to that order.

*Pangium edule*, Reinw., a tree of great importance in the domestic œconomy of the Malays, and abundantly cultivated throughout the Malayan islands, has hitherto been botanically known only through the character of the genus published by Professor Reinwardt, and by the proposal of Dr Blume to found on it a family to be named *Pangieæ*, in which he includes the genera *Hydnocarpus* and *Vareca* of Gærtner. This family was some years ago indicated by Mr Brown in a verbal communication to M. Zuccarini, in which he referred *Hydnocarpus* and *Gynocardia*, Roxb., to a distinct family then unnamed. Of this family, and of the three genera *Pangium*, *Gynocardia* and *Hydnocarpus* (all of which are referred by Prof. Endlicher to *Hydnocarpus*), Mr Bennett gives detailed and distinctive characters. He agrees with Roxburgh in referring *Vareca*, Gærtn., to *Casearia*, and states that the three species of which Roxburgh has composed his own genus *Vareca* belong to three distinct genera. Of the first of these, *Vareca Moluccana*, he gives from Roxburgh's specimens the character of the female, which alone appears to have been grown in the Calcutta Garden; Mr Brown had already, in Dr Wallich's List, referred the second, *V. lanceolata*, to *Pentaloba*, Lour.; and the third, *V. heteroclita* (also referred by Dr Wallich to *Pentaloba*), forms a new and very distinct genus in the same remarkable tribe of *Violarieæ*.

The elegant Melastomaceous genus, called *Sonerila* by Roxburgh, forms the subject of the forty-fourth article. The species figured is the *Sonerila tenuifolia*, Bl. The natural relations of this genus were at first strangely misunderstood. Mistaking an expression of Roxburgh's, Sprengel referred it to *Burmanniaceæ*, and Don, having mixed up with it a species of *Argostemma*, described it as monopetalous, *sui ordinis, Ericeis affine*. Dr Wallich, however, restored it to its proper position among *Melastomaceæ*. In the subdivision of that family into tribes, it has since been variously placed by different authors, but Mr Bennett is inclined to regard it as having no close affinity with any other genus of the family, except *Sarcopyramis*, Wall., with which it agrees in all its essential characters, and from which it differs only in points of minor importance. The most remarkable of these characters consists in the opposition of the cells of the ovarium to the teeth of the calyx, which in this case (as in others previously noticed) "appears to be only of generic value; for although it is found in some other Melastomaceous genera with isomerous ovaria, the ordinary relation is also of frequent occurrence in the family, and the difference bears no relation to what appear to be its natural divisions. But combined with this structure there also occurs, in *Sonerila* and *Sarcopyramis*, a curious modification of the apex of the ovarium, which is surmounted by fleshy scales, opposite to the petals and equal to them in number, between which and the free limbus of the calyx-tube the anthers are lodged in their early and deflected stage. These scales, which are at first of small size, become (as the capsule ripens) gradually enlarged, thickened, and of a coriaceous texture." The characters of *Sarcopyramis* are given and compared with those of *Sonerila*, and a synopsis of the species of the latter, as far as known to the author, concludes the article.

The next article concludes the third part of the work. It is a most important memoir by Mr Brown on the tribe *Sterculieæ*, a new genus of which, named by the author *Pterocymbium*, forms the groundwork of the article. Mr Brown gives first an elaborate historical account of the tribe, and especially of the genus *Sterculia*, from its formation to the present time, accompanied by critical notes on the successive modifications introduced by the numerous authors who have treated of it as a whole, or who have made additions to our knowledge of its parts. This is followed by some general observations on the relative importance of the different organs in the formation of genera, in the course of which are noticed some remarkable deviations from the ordinary rule which attaches the highest value to the direction of the embryo with relation to the umbilicus of the seed, and a startling anomaly (not easily reconcileable with the views hitherto entertained of the mode in which a change is effected in the relative position of the foramen of the ovulum) is for the first time pointed out. We copy the passage in which this remarkable phænomenon is described:

"The direction of *Embryo*, with relation to the insertion or umbilicus of the seed, appears to be by far the most important character, or that which is best supported by other modifications of structure; and it is worthy of remark, that in this point the ordinary direction of the embryo in the tribe, namely, the radicle seated at the opposite extremity or apex of the seed, is itself a deviation from the more usual structure of Phænogamous plants, and an exception not only to the other tribes of *Sterculiaceæ*, but to the whole of the natural class *Malvaceæ*, to which that order belongs; and it becomes still more remarkable in regard to the state of the unimpregnated ovulum, which I have some reason to believe is not orthotropous as might be expected, and as it has been described, but apparently anatropous, and that perhaps in the whole tribe. As, however, my observations on this subject are entirely made from the macerated ovaria of dried specimens, the statement here made must be received as requiring confirmation from the examination of living plants, and of a greater number of species.*

"From this ordinary direction of embryo in the tribe the deviations are of two kinds: the first, and no doubt the more important, is that in which the radicle is placed at a point close to the umbilicus, which is the most general structure in Phænogamous plants; but as it never points directly within the umbilicus, either in this or any other family, I have modified the expression generally employed in such cases. The second deviation is where the umbilicus is placed on or near the middle of the ripe seed with the radicle pointing to its lower extremity, in other words, where the embryo is parallel to the umbilicus. But this position of umbilicus of the ripe seed does not necessarily imply an exactly similar insertion in the unimpregnated ovulum, and in this tribe I am inclined to believe, that in many cases the foramen of the ovulum is so close to the umbilicus as to appear anatropous, and that it ultimately becomes more distant from the unequal growth of the opposite extremities of the seed"

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* "The species of *Sterculia*, in which I have found this unexpected position of foramen in the unimpregnated ovulum, are *fœtida*, *guttata*, *carthaginensis*, *nobilis* and *angustifolia*; and in the ripe seeds of *tragacanthæ*, *urens*, *villosa* and *quadrifida*, an indication of a lateral foramen near the base is still visible, but which in *fœtida* I have not been able to detect."

The characters of the tribe *Sterculieæ*, and a synopsis of the genera and species belonging to it, complete the article Of the genera, three, viz *Tetradia*, *Pterocymbium* and *Courtenia*, are entirely new, as is also a genus of doubtful position described under the name of *Micrandra* The whole number of species referred to the tribe is sixty-seven, of which thirty-three are now for the first time described

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## PROCEEDINGS OF LEARNED SOCIETIES

### LINNÆAN SOCIETY

### *Anniversary Meeting*

May 24 1844 —The Lord Bishop of Norwich President in the Chair

The President opened the business of the Meeting, and the number of Members whom the Society had lost during the past year having been stated, the Secretary proceeded to read the following notices of some among them

The deaths among the Fellows have amounted to eight Among these the first name is that of

*William Allen, Esq*, a gentleman more distinguished by his investigations in experimental philosophy than by the pursuit of natural history, and still more by that active and unwearied benevolence which has identified his name with almost every recent effort for the amelioration of the condition of mankind Of such a man we cannot but feel a pleasure in recording that he was for forty-two years a Fellow of this Society and that, however occupied in other pursuits, he never ceased to take a warm interest in botanical investigations

His business being that of a chemist, Mr Allen's attention was naturally directed to that science, and in conjunction with Mr Pepys he published several valuable chemical papers in the 'Philosophical Transactions' of the Royal Society of which he became a Fellow in 1807 The first of these "On the quantity of Carbon in Carbonic Acid and on the Nature of the Diamond," was published in 1807, and was succeeded in 1808 and 1809 by two papers 'On the changes produced in Atmospheric Air and Oxygen Gas by Respiration," and in 1829 by another "On the Respiration of Birds"—subjects which he and his friend Mr Pepys illustrated by a series of the most delicate experiments

The only paper contributed by Mr Allen to our own Transactions was read in May 1805, and contains an account of some experiments made by him on a substance called *Dapeche*, sent to Sir Joseph Banks from South America by M de Humboldt, which, although very different in external appearance, he determined by analysis to be a mere modification of Caoutchouc

Mr Allen was for several years a very popular Lecturer on Experimental Philosophy at the Royal Institution, and for more than twenty years (viz from 1804 to 1827) he filled the office of Lecturer on the same subject at Guy s Hospital In 1807, cooperating with the late Mr Joseph Fox, he first directed his energies to assist in the struggle which Joseph Lancaster was then making to establish his system of mutual instruction, and from this period, his time and attention were by degrees almost wholly devoted to that great undertaking His death occurred in the 74th year of his age, at Lindfield in Sussex, where he had resided for many years for nearly half his time, occupied in the superintendence of some important experiments for the promotion of an improved condition of the working classes in agriculture by means of education and allotments of land on which subject he published several interesting essays

*Richard Forester Forester, Esq M D* President of the Derby Philosophical Society, and for five and forty years a Fellow of the Linnæan Society, died on the 5th of December last, in the 73rd year of his age He was at the head of his profession in the town of Derby and took a leading part in most of the useful and benevolent institutions of his neighbourhood, being also the senior magistrate of the county, and an alderman and a magistrate of the borough He was distinguished for classical attainments and a refined taste, and had formed a collection of fossils which he bequeathed to the Museum of the Derby Society To the Arboretum so nobly presented to the town by the late Mr Joseph Strutt (and the formation of which is regarded as one of the most successful labours of another of our Fellows whom it will be my duty presently to notice more particularly), Dr Forester bequeathed the sum of 300*l* besides several considerable legacies to charitable institutions

*James Barlow Hoy, Esq*, who for several years represented the borough of Southampton in Parliament, was much attached to ornithology, and at the time of his melancholy death was on a tour in the Pyrenees, with the object of collecting rare birds His death, which took place on the 13th of August last, at the Hospice de Vieille, was occasioned by the bursting of his gun while engaged in his favourite pursuit

*John Claudius Loudon, Esq* was born at Cambuslang in the county of Lanark, on the 8th of April 1783 He was the eldest son of a respectable farmer in the neighbourhood of Edinburgh, and his mother being left a widow with a large family, his exertions were early called forth to assist in providing for their support At the age of twenty he came to England, and began to practise as a landscape gardener, the profession for which he had been educated, and which he afterwards cultivated with so much success In 1806 he became a Fellow of the Linnæan Society, and in 1809 resided in Oxfordshire, where he had taken an extensive farm He subsequently made several tours on the continent, visiting Sweden, Russia, Poland and Austria in 1813, 1814 and 1815, Italy in 1819, and France and

Germany in 1828 During the latter years of his life he resided at Bayswater in the neighbourhood of London

Soon after his first arrival in England he was visited by a severe attack of inflammatory rheumatism which disabled him for two years and terminated in an anchylosed knee and a contracted left arm During a subsequent attack in 1820 his right arm was broken in the operation of shampooing, and not having properly united was again broken in 1825 when its amputation became necessary At the same time the thumb and two of the fingers of his left hand were rendered useless He afterwards suffered frequently from attacks of illness, and died on the 14th of December 1843 of the effects of severe and long-continued disease of the lungs

Such were the adverse circumstances under which Mr Loudon commenced and pursued a career of literary labour of no ordinary extent, of much variety of subject, and requiring intense severity of application His first essay was published in 1803, and for forty years he continued almost without intermission the publication of a series of works, original and compiled, chiefly devoted to agriculture, horticulture and rural architecture, and of a highly useful and practical character The number and magnitude of these works the incessant labour required in their production, and the anxieties necessarily attendant on the large outlay of money involved in them were sufficient to undermine a constitution of far greater strength, but his energy and enthusiasm supported him through every difficulty and did not desert him even on his death bed He has left a widow and one child a daughter, the former well known by various publications, and especially by her 'Ladies Flower-Garden' and Ladies' Botany'

*James Macartney Esq M D F R S &c*, was born in Armagh in March 1770, and was educated in the country He was not originally destined for any profession, but in 1794 he apprenticed himself to Dr Hartigan then Professor of Anatomy to the Royal College of Surgeons in Ireland In 1798 he removed to London where he became Demonstrator of Anatomy in St Bartholomew s Hospital and two years afterwards commenced lecturing on Comparative Anatomy and Physiology This course, of which he published a Prospectus in 1806, was continued until 1810 In the following year he was elected a Fellow of the Royal Society and having returned to Ireland was in 1813, on the death of his former teacher Dr Hartigan, elected Professor of Anatomy and Surgery in Trinity College, Dublin, which office he filled for four-and twenty years He died of apoplexy on the 6th of March 1843

Both as a comparative anatomist and an improver of the practice of surgery, Dr Macartney is entitled to honourable mention The more important of his contributions to Comparative Anatomy were published in Rees's 'Cyclopædia,' in which the principal articles on that subject were written by him To the 'Philosophical Transactions' he contributed some valuable "Observations upon Luminous Animals," published in the volume for 1810, and "An Account of an Appendix to the small Intestines of Birds," in that for 1811 A memoir "On the Anatomy of the Brain of the Chimpanzee" appeared soon after his death in the 'Transactions of the Royal Irish Academy,' of which he had long been an active Member, and to whose Transactions he had previously contributed an essay "On the Curvatures of the Spine." He also made several minor communications to the British Association for the Advancement of Science, and to the Académie de Médecine of Paris, of which he was a Foreign Member. Of the Linnæan Society he became a Fellow in 1814, but he has no paper in our Transactions.

As a lecturer it is stated of him, that "though his manner was unadorned by the arts of verbal eloquence, he became highly popular from the ideas which he imparted and the distinct and logical language in which they were clothed; his classes were always very large, and by his means the reputation of the Medical School of the University of Dublin was materially elevated." His introductory Lecture to the Anatomical Course of 1824 was published in 1826; and the substance of his Lectures on Inflammation, the most important and original part of his Surgical Course, are given in his 'Treatise on Inflammation,' published the year after he resigned his Professorship. This volume contains an exposition of his views on the proximate cause of inflammation, and of his mode of administering steam fomentations and applying water dressings, now so universally and beneficially adopted in surgical practice.

*Charles Saville Onley, Esq.*

*Simon Stephenson, Esq.*

*George William Wood, Esq.*, was the eldest son of the Rev. William Wood of Leeds, an early Fellow of the Society, and the intimate friend of our founder and first President. He was born in 1781, and became connected at an early age with one of the largest establishments in Manchester, of which he continued to be a partner until its dissolution, when he retired from business with a handsome fortune. At the general election for 1832 he was returned to Parliament for the Southern Division of the county of Lancaster, and in 1837 for the borough of Kendal, which he continued to represent till his death. Although endowed with an hereditary fondness for botany and with a strong attachment to geology, the active pursuits of business and the conscientious discharge of his public duties left him little leisure for their cultivation; but he was ever ready to promote the views of those who were more actively engaged in the prosecution of science, and to render them such services as his position enabled him to perform. Of this disposition we have a striking proof in the Bill introduced by him and carried through Parliament in the course of the last Session, the effect of which is to exempt scientific societies from local taxation, a bill for which we have ourselves reason to feel grateful, as relieving our funds from a burthen of some importance. The circumstances of his death may also be referred to as connected with his attachment to science: it occurred suddenly in the rooms of the Literary and Philosophical Society of Manchester, of which he was one of the Vice-Presidents. While engaged in an animated conversation on the progress of the Ordnance

Survey, his breathing was observed to become difficult, and the moment after he was found to be dead.

Among our *Foreign Members* we have to commemorate

*Don José Pavon*, a botanist of considerable merit, and the colleague of Ruiz in the memorable botanical expedition dispatched to Peru by the Spanish Government in the year 1777, from which were obtained such important results both in collections and publications. On the recommendation of Ortega, then Professor of Botany at Madrid, the expedition was placed under the direction of Ruiz, who was accompanied by Pavon and by two artists, Brunete and Galvez. M. Dombey also, who had been dispatched from France on a similar mission, was allowed to accompany them; and during a residence of ten years they visited many of the most interesting districts of Peru and Chile. In 1788 Ruiz and Pavon returned to Europe, bringing with them large collections of plants and an extensive series of botanical drawings, and leaving behind them two of their pupils, Tafalla (afterwards Professor of Botany in the University of Lima) and Pulgar (an artist of merit), to continue their investigations. The collections thus made by themselves, and those which were subsequently transmitted to them, formed the basis of a series of works on the botany of the Western Regions of South America, which, had they been carried on to completion, would have been indeed a magnificent contribution to science, and which even in their present incomplete state are of high importance. The first of these publications appeared in 1794, under the title of 'Floræ Peruvianæ et Chilensis Prodromus,' and contains descriptive characters and illustrative figures of their new genera. This was followed in 1798 by the first volume of the 'Flora Peruviana et Chilensis,' two other volumes of which, extending as far as the class *Octandria* of the Linnæan system, were published in 1799 and 1802. The plates of a fourth volume, as well as many others intended for subsequent publication, were also prepared. In 1798 also was published the first volume of a smaller work without figures, entitled 'Systema Vegetabilium Floræ Peruvianæ et Chilensis,' containing characters of all their new genera and of the species belonging to them, as well as of all the other species described in the first volume of their Flora.'

Of the immense collections made by Ruiz and Pavon and other botanists in the Spanish possessions in America, a large portion was purchased by Mr. Lambert between the years 1817 and 1824. These were dispersed at the sale of his herbarium in 1842; but a part of them was then obtained for the British Museum, where they are now deposited. Little is known of the latter years of Pavon; his correspondence with Mr. Lambert appears to have ceased in 1824, and even the exact date of his death has not been ascertained.

The President also announced that 19 Fellows, 2 Foreign Members, and 1 Associate had been elected since the last Anniversary.

At the election which subsequently took place, the Lord Bishop of Norwich was re-elected President; Edward Forster, Esq., Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the

Council in the room of others going out viz Francis Boott, M D , Edward Forbes Esq , Professor of Botany in King's College, London , the Rev William Hincks , Daniel Sharpe, Esq , and William Spence, Esq

## ZOOLOGICAL SOCIETY

Dec 12, 1843 (*continued*) —Wm Yarrell Esq , V P in the Chair

'Descriptions of new species of Shells figured in the 'Conchologia Iconica, ' by Mr Lovell Reeve (*continued*)

Pleurotoma pica *Pleur testâ crassâ, obtuso-pyramidali, albâ, maculis fuscis paucis, grandibus, subquadratis, irregulariter variegatâ, anfractibus eleganter semicostatis costis angustis, numerosis, superne lævibus concavis, sinu lato*

Conch Icon , *Pleurotoma* pl 8 f 61

*Hab* Island of Capul, Philippines , Cuming

A very solid white shell, pied here and there with dark brown blotches

Pleurotoma alabaster *Pleur testâ turritâ intùs extusque nivea, roseo interdum leviter tincta transversim subtilissime sulcatâ et striata, anfractibus longitudinaliter costatis superne subdepressis, sinu lato*

Conch Icon *Pleurotoma* pl 8 f 65

*Hab* Island of Siquijor Philippines (found in loose coral sand on the reefs at low water) Cuming

The sculpture of this shell is exceedingly delicate, the cross grooves looking as if they had been graved with an etching-point

Pleurotoma venusta *Pleur testâ obeso fusiformi, flavicante, fusco maculatâ, anfractibus rotundatis, transversim multicostatis, oblique maculatis superne depressis maculis majoribus vivide pictis, canali elongato*

Conch Icon , *Pleurotoma* pl 9 f 79

*Hab* Island of Siquijor Philippines (found in coral sand on the reefs at low water) ; Cuming

This highly interesting shell which is at present unique in Mr Cuming s collection differs materially both in form and in the colour and character of the marking, from any of its congeners

Pleurotoma eximia *Pleur testâ gracili fusiformi albâ anfractibus convexis, costis angustis longitudinalibus striisque transversis elevatis, eximie cancellata, sinu subindistincto, canali mediocri, leviter tortuoso*

Conch Icon , *Pleurotoma* pl 10 f 82

*Hab* Island of Masbate, Philippines (found under stones at low water) , Cuming

The canal of this Muriciform species, though somewhat indistinct, fully entitles it to a place amongst the *Pleurotomæ*

Pleurotoma albibalteata *Pleur testa ovato oblongâ luteâ, albibalteatâ, anfractibus convexis transverse lineatis, longitudinaliter noduloso-costatis, labro incrassato, sinu parvo, canali brevi, recurvo*

Conch Icon , *Pleurotoma*, pl 10 f 84

*Hab* Island of Ticao, Philippines (found in sand at the depth of six fathoms) Cuming

PLEUROTOMA TRITONOIDES *Pleur testâ subovali apice acuto, fulvâ, pallidè albifasciatâ, anfractibus convexis, costis longitudinalibus, subtilissime nodulosis, lineis transversis elevatis eximie cancellatis, labro incrassato, sinu parvo, canali brevi, subrecurvo*

Conch Icon *Pleurotoma*, pl 10 f 85

*Hab* Bais island of Negros Philippines (found in coral sand at the depth of seven fathoms), Cuming

This shell is of a duller and more uniform colour than the preceding the last whorl is more ventricose and the longitudinal ribs are finer and more numerous

PLEUROTOMA ABBREVIATA *Pleur testâ abbreviato fusiformi, cæruleo albâ nigro maculatâ et punctatâ, anfractibus medio angulato-carinatis carinâ medio partitâ superne depressis funiculo maximo nigro maculato cingulatis, inferne multifuniculatis funiculis minoribus nigro lineatis et punctatis, canali vix elongato*

Conch Icon, *Pleurotoma*, pl 10 f 86

*Hab* Island of Masbate Philippines (found on the reefs at low water) Cuming

A very interesting species which looks at first sight like a broken portion of the *Pl tigrina* A number of specimens were collected by Mr Cuming at the above-mentioned island

PLEUROTOMA BIJUBATA *Pleur testâ cylindraceo-pyramidali fuscâ fuscescente carinatâ, anfractibus convexis æquidistanter carinatis carinis duabus centralibus jubatis, aperturâ brevi, canali brevissimo*

Conch Icon *Pleurotoma* pl 10 f 87

*Hab* Island of Burias Philippines (found under stones at low water), Cuming

Of the two crested keels which encircle this very characteristic species the upper one is the more faintly developed

PLEUROTOMA PLANILABRUM *Pleur testâ ovato-oblongâ apice acuto, rubido fuscâ, anfractibus convexis, transverse lineatis longitudinaliter costatis, costis fere obsoletis, aperturâ oblongâ, labro plano rubido intus denticulato, canali brevissimo*

Conch Icon, *Pleurotoma*, pl 10 f 88

*Hab* Sibonga, island of Zebu, Philippines (found under stones at low water), Cuming

The posterior extremity of the lip in this shell is acuminated to a sharp point

PLEUROTOMA CORUSCA *Pleur testa subpyramidali, valdè politâ, anfractibus supernè planis, fusco alboque nebulosis, inferne leviter prominentioribus, punctis fuscis irregularibus cingulatis anfractu ultimo punctorum seriebus duabus cingulato, aperturâ brevi, canali brevissimo*

Conch Icon, *Pleurotoma*, pl 10 f 89

*Hab* Island of Capul, Philippines, Cuming

Two specimens only of this shell were found by Mr Cuming on the reefs at the above-mentioned island

**Pleurotoma Harfordiana.** *Pleur. testâ obeso-pyramidali, anfractibus nigerrimis, in medio luteo-balteatis convexis transversim subtilissime striatis superne depressiusculis, serie unicâ nodulorum ornatis, infra noduloso costatis, aperturâ breviusculâ, sinu parvo rotundato.*

Conch. Icon. *Pleurotoma*, pl. 11. f. 93.

**Pleurotoma Perronii.** *Pleur. testâ fusiformi, turritâ, læviusculâ, pallide luteâ, anfractibus planis superne leviter angulatis, ultimo inferne coarctato transversim lirato, liris regularibus, subdistantibus, sinu subcentrali, canali subelongato, recto.*

Conch. Icon., *Pleurotoma*, pl. 11. f. 94.

*Murex Perron*, Chemnitz Conch. vol. x. pl. 164. f. 1573.

This interesting shell has been confounded by Lamarck with the *P. spirata*. It differs from that species in being more erect and fusiform, in the sutures of the whorls being less deeply channeled, and in the lower portion of the last whorl being crossed with about four or five narrow, well-developed ridges.

**Pleurotoma pluteata.** *Pleur. testâ fusiformi gracili fulvâ, anfractibus convexis, pluteo superne ornatis, medio nodulis albidis catenulatis, infrà subtilissime sulcatis, sinu lato, canali elongato.*

Conch. Icon. *Pleurotoma*, pl. 12. f. 101.

The shelf which passes round the upper portion of the whorls is not less characteristic of this species than the delicate chain of white nodules which encompass the centre.

**Pleurotoma mystica.** *Pleur. testâ abbreviato-fusiformi rubido-fuscâ, anfractibus superne concavis striatis infra angulatis tuberculis albis, connatis, ad angulum acute carinatis, anfractu ultimo inferne nodulorum seriebus plurimis cingulato.*

Conch. Icon. *Pleurotoma*, pl. 12. f. 107.

Chiefly distinguished by the white turreted keel.

**Pleurotoma Philippinensis.** *Pleur. testâ ovato-turritâ ventricosâ, subpellucidâ albidâ, anfractibus sex septemve, longitudinaliter costatis, costis eximiis subcompressis, subdistantibus, nigro aut fusco alboque variè pictâ, transversim liratis, liris minutis, subcontiguis, numerosis, columellâ subtortuosâ, aperturâ ovatâ amplâ, canali brevissimo.*

Conch. Icon. *Pleurotoma*, pl. 13. f. 109.

*Hab.* Islands of Masbate and Luzon, Philippines (found under stones at low water), Cuming.

**Pleurotoma Rissoides.** *Pleur. testâ elongato-ovali, lævi, nitente, semipellucidâ, albicante fulvo pallidissime nebulosè strigatâ, anfractibus septem tribus longitudinaliter plicatis, apice rubello, columellâ spiraliter tortuosâ, canali brevissimo, leviter recurvo, labro subincrassato intùs eximie denticulato, sinu parvo, distincto.*

Conch. Icon. *Pleurotoma*, pl. 13. f. 111.

This species reminds me somewhat of the *Rissoa deformis*; the first whorl or two are plaited as in that shell; the surface is moreover smooth and shining, and they bear a general resemblance to each other in size. The apex of this shell is peculiar in being pink, whilst there is not the least indication of that colour in any other part.

**Pleurotoma Boholensis** *Pleur testâ subelongatâ, tenui, subpellucidâ, albidâ, fulvo subindistinctè virgatâ, anfractibus octo, transversim lineatis et lirulis, striis quoque subtilissimè reticulatis, columellâ spiraliter tortuosâ, canali brevissimo, paululùm recurvo, labro simplici, acuto, sinu parvo*

Conch Icon, *Pleurotoma*, pl 13 f 112

*Hab* Island of Bohol, Philippines (found under stones on the reefs at low water), Cuming

This shell, which is of a much thinner and slighter composition than either of the two preceding ones, is very finely reticulated over with striæ, and it has a number of lines and ridges running transversely across the whorls, but none longitudinally

**Pleurotoma gracilenta** *Pleur testâ gracillimâ fusiformi, fulvâ anfractibus convexis, longitudinaliter costellatis, costellis leviter nodulosis striis elevatiusculis transversis decussatis, labro subflexuoso sinu lato, canali breviusculo*

Conch Icon, *Pleurotoma*, pl 14 f 114

*Hab* Loay, island of Bohol, Philippines (dredged from sandy mud at the depth of seventeen fathoms), Cuming

A shell of simple character unlike any hitherto described species, though not presenting any very striking peculiarity

**Pleurotoma tessulata** *Pleur testa subacuto-fusiformi, fulvâ vel cinereâ, anfractibus leviter convexis, longitudinaliter costatis, costis subdistantibus striis transversis subobsoletis decussatis, labro tenui, sinu parvo, canali breviusculo, subrecurvo*

Conch Icon, *Pleurotoma* pl 14 f 115

*Hab* Bolinao, island of Luzon, Philippines (dredged from sandy mud at the depth of ten fathoms) Cuming

Although the ribs in this species are comparatively distant from each other, they vary considerably in this respect in different individuals, the more elongated the shell the closer the ribs, as shown by the specimens figured

**Pleurotoma contracta** *Pleur testâ elongato ovatâ albidâ, anfractibus plano-convexis, supernè contractis, costellis longitudinalibus numerosis striisque transversis elevatis eximie reticulatis, sinu lato, canali brevi*

Conch Icon, *Pleurotoma*, pl 14 f 116

*Hab* Cagayan province of Misamis, island of Mindanao, Philippines (dredged from sandy mud at the depth of twenty-five fathoms), Cuming

This species may be recognized by the peculiar contraction of the whorls near the suture, the sculpture is not much unlike that of the *C gracilenta*

**Pleurotoma cedo nulli** *Pleur testâ lanceolato-fusiformi, eximie turritâ, apice acuto, griseo-albicante, anfractibus in medio valde carinatis, carinâ compressa, pereleganter diademata, sinu amplo canali longissimo*

Conch Icon, *Pleurotoma*, pl 14 f 117

*Hab* Bay of Panama (found in sandy mud at the depth of ten fathoms), Cuming

PLEUROTOMA CRASSILABRUM *Pleur testâ ovato-turritâ, flavicante fusco cæruleoque variè zonatâ, anfractibus convexis superne lævibus, infrà tuberculato costatis costis striis transversis elevatiusculis decussatis, aperturâ brevi subrotundata, canali brevi, subtortuoso, labro valde incrassato, varicoso, intùs acuto, sinu rotundato*

Conch Icon *Pleurotoma*, pl 14 f 118 *b* & *c*

*Hab* Island of Ticao, Philippines (found on the reefs), Cuming

Var *β* *Testa incolorata, striis transversis ferè obsoletis*

Conch Icon, *Pleurotoma*, pl 14 f 118 *a*

*Hab* Island of Masbate Philippines (dredged from sandy mud at the depth of seven fathoms) Cuming

The blue and brown colouring of the first variety is very conspicuous between the ribs The var *β*, which is colourless, seems to have a thin epidermis upon it

PLEUROTOMA HINDSII *Pleur testâ ovata subinflatâ albida, fuscescente pallidè variegata, anfractibus costis duabus ultimo costis quatuor, distantibus, cingulatis costellis numerosis, compressis, eximiè cancellatis, apertura ovata, canali brevi*

Conch Icon *Pleurotoma* pl 14 f 119

*Hab* Baclayon, island of Bohol, Philippines (found under stones on the reefs at low water), Cuming

PLEUROTOMA LACTEA *Pleur testa ovato oblongâ, tenui subinflata lacteâ costis carinisve rotundatis striisque exilibus cinctâ, labro simplici acuto, sinu parvo, aperturâ ovata, canali brevissimo*

Conch Icon, *Pleurotoma*, pl 15 f 123

*Hab* Bolinao island of Luzon and Gindulman, island of Bohol, Philippines (found under stones at low water) Cuming

PLEUROTOMA BREVICAUDATA *Pleur testa abbreviato fusiformi, solidâ luteola apice basique fuscescentibus, anfractibus convexis, supernè unicarinatis, infra bicarinatis anfractu ultimo multicarinato, labro simplici, acuto, sinu amplo, apertura parvâ, brevi, canali breviusculo*

Conch Icon *Pleurotoma*, pl 15 f 126

*Hab* Island of Ticao (found on the reefs) Cuming

This shell reminds one somewhat of the *P jubata*, but has no indication of the pretty beaded crest which distinguishes that species

PLEUROTOMA DIGITALE *Pleur testâ obeso-oblongâ, nigerrimo-fuscescente, apicem versus incolorata, anfractibus convexis tuberculis albidis minutis seriatim clathratis, aperturâ breviusculâ, sinu lato*

Conch Icon *Pleurotoma* pl 17 f 138

*Hab* Island of Burias, Philippines (found under stones at low water), Cuming

PLEUROTOMA HASTULA *Pleur testâ elongato-fusiformi, solidiusculâ, albida, fuscescente sparsim maculatâ anfractibus liris subtilissimis numerosis cinctis lirâ centrali lirisque superis majoribus, prominentibus, canali gracili, fissurâ profunda*

Conch Icon, *Pleurotoma*, pl 17 f 139

This species is chiefly characterized by the stout double ridge that encircles each whorl near the suture, and by the central ridge that is formed in place of the slit as the shell advances in growth

PLEUROTOMA CUIRLA *Pleur testâ acuminato-turritâ, anfractibus superne depressis, fuscescentibus, liris nodulosis, subflexuosis, distantibus longitudinalibus ornatis, aperturâ brevi, sinu lato*

Conch Icon, *Pleurotoma*, pl 17 f 140

The little dark brown flexuous ridges, passing down the whorls of a much lighter brown, have a neat and conspicuous appearance

PLEUROTOMA VARICOSA *Pleur testâ acuminato-turritâ anfractibus superne lævibus infrà longitudinaliter costatis costis subirregularibus, griseis, interstitiis griseo-cæruleis, transversim striatis varicibus rudibus lutescentibus grandibus sparsis peculiariter notatis, canali brevissimo leviter recurvo, sinu lato, subprofundo*

Conch Icon *Pleurotoma* pl 17 f 141

*Hab* Calapan island of Mindoro Philippines (found in coarse sand at the depth of fifteen fathoms) Cuming

Var β *Testa omnino fusca*

*Hab* Island of Corrigidor, Philippines (found in coarse sand at the depth of six fathoms), Cuming

This species may be easily recognized by its prominent display of varices

PLEUROTOMA CARBONARIA *Pleur testâ turritâ carbonariâ, anfractibus prope suturas depressis, lævibus, infra costatis, costis angustis distantibus nodulosis, columella callositate superne munitâ, canali brevi, sinu latissimo, profundo*

Conch Icon, *Pleurotoma*, pl 17 f 145

All the specimens I have seen of this dark Melania like species have the apex either decorticated or broken away, an indication of their living in brackish water

PECTUNCULUS SPURCUS *Pect testâ subquadrato-ovali gibba, glauco-fuscâ longitudinaliter costatâ, costis numerosis, angustis, subtilissime striatis, umbonibus albicantibus obliquis*

Conch Icon, *Pectunculus*, pl 7 f 36

*Hab* Bay of San Carlos (found in coarse sand at the depth of sixteen fathoms) Cuming

The width of this little species from the umbones to the margin is comparatively shorter than that of any other species

PECTUNCULUS PERTUSUS *Pect testâ orbiculari, albâ fusco undatim pictâ, radiatim costata, costis subtilissimè pertusis, umbonibus centralibus*

Conch Icon, *Pectunculus*, pl 7 f 37

*Hab* Islands of Mindanao and Luzon, Philippines (found in coarse sand at the depth of ten fathoms), Cuming

This interesting little species presents a marked peculiarity in the ribs being finely pricked on each side Two or three specimens only were collected by Mr Cuming at the above-mentioned islands

PECTUNCULUS OCULATUS *Pect testâ sub-Pectiniformi, radiatim* *costatâ, fuscâ, maculis albis, supernè nigro-marginatis, sparsim et irregulariter ornatâ, umbonibus centralibus, subobliquis*

Conch Icon *Pectunculus* pl 7 f 38

*Hab* West Indies

Pectunculus cancellatus *Pect testâ obliquè Pectiniformi, striis subtilissime cancellatâ, albâ, epidermide luteâ holosericâ partim indutâ, umbonibus prominentibus, centralibus*

Conch Icon, *Pectunculus* pl 7 f 39

*Hab* Singapore (found in sandy mud at the depth of seven to ten fathoms), Cuming

This little shell is very thin and fragile, and perfectly white, the entire surface being delicately cancellated and covered towards the margin with a thick pale yellow epidermis There is no possibility of confounding it with any other species

Pectunculus morum *Pect testâ sub-Pectiniformi, pallidè purpureo-rubrâ, maculis rubidis elongatis sparsim et irregulariter pictâ, radiatim costatâ, costis lævibus, umbonibus subcentralibus*

Conch Icon, *Pectunculus*, pl 7 f 40

*Hab* Madagascar?

A very pretty species in which the ribs radiate somewhat more obliquely than usual the general appearance of the shell is not much unlike that of the *P tessellatus* it is however lighter and more depressed, with colour and spotting of somewhat different character

Pectunculus Siculus *Pect testâ orbiculari depressiusculâ subæquilaterali longitudinaliter sulcatâ et striatâ, rubido castaneâ, fusco transversim zonatâ zonis sæpè obscuris, umbonibus testæ junioris interdum albimaculatis*

Conch Icon *Pectunculus*, pl 7 f 41

*Pectunculus glycimeris*, Lamarck Philippi

Testa junior

*Arca bimaculata*, Poli

*Hab* Mediterranean coast of Sicily

Having adopted the old *P glycimeris* of British authors I distinguish the *P glycimeris* of Lamarck by the above new title Through some unaccountable neglect these two very different shells have been hitherto published under the same title and it is hoped that this present amendment will be appreciated

Pectunculus perdix *Pect testâ orbiculato cordatâ subauritâ, radiatim costatâ, costis planulatis, subindistinctis longitudinaliter striatis, strigis rubido-fuscis, transversis, angulato undatis, profusè pictis*

Conch Icon, *Pectunculus* pl 8 f 46

*Hab* Straits of Malacca (found in mud at the depth of seventeen fathoms), Hinds

The form of this shell approximates very closely to that of the *Pectunculus zonalis* but the painting of it is of a very different character The beautiful specimen here figured, collected by Sir E Belcher, is the only example of the species I have seen, with the exception of a small, worn, odd valve in the collection of M Deshayes

Pectunculus spadiceus *Pect testâ orbiculari, radiatim striatâ,* *pallidè spadiceâ, umbones versus albâ, strigis latis, undatis, ornatâ, epidermide holosericâ, intus albâ, margine exiliter crenulato*

Conch Icon *Pectunculus*, pl 8 f 47

There is no very striking peculiarity in this species although it is too distinct from any other to require comparison I have seen several specimens of it, both in London and Paris, but have not succeeded in obtaining its true locality

PECTUNCULUS FORMOSUS *Pect testâ lenticulari subdepressa, vel lævi vel subobscurè radiatâ, subtilissimè concentricè striatâ, luteo-lacteâ, maculis sparsis violaceo purpureis, longitudinaliter inquinatis, formosè pictâ*

Conch Icon *Pectunculus*, pl 8 f 48

There are two or three specimens of this handsome shell at Paris, both in the collection at the Jardin des Plantes and in that of M Delessert

PECTUNCULUS SERICATUS *Pect testâ orbiculari, Pectiniformi, depressiuscula, albida, rosaceo-fusco sparsim tinctâ et maculatâ, epidermide sericea crassâ indutâ, radiatim sulcatâ, sulcis subdistantibus, intus albâ*

Conch Icon , *Pectunculus* pl 9 f 49

*Hab* Island of Tortola West Indies

This exceedingly delicate shell is remarkable for its glossy silken epidermis, the hinge-shelf in the interior of each valve is nearly as broad and solid as that of the *Pectunculus strigilatus*, and the teeth are as closely set, the shell altogether exhibits many characters in common with that species, but no indication of the peculiar manner in which it is attenuated towards the umbones

This is the only specimen I have seen at present

PECTUNCULUS LIVIDUS *Pect testâ orbiculari, tumidâ, inæquilaterali antice angulata, longitudinaliter radiatâ, radiis latis, elevatiusculis, subtilissime striatis, rubido-fuscis, marginem versus livido-cæsiis, epidermide pilosâ plus minusve indutis, radiis anticis creberrimis, umbonibus rectè incurvis, maculis albidis perpaucis circumsparsis, intus albâ, medio purpureo-nigricante tinctâ et maculatâ*

Conch Icon , *Pectunculus*, pl 9 f 51

*Hab* Red Sea

PECTUNCULUS DELESSERTII *Pect testâ orbiculari tumidiusculâ, subsolidâ, inæquilaterali, altitudine longitudinem æquante, radiatim sulcatâ, sulcis numerosis profundis, subtilissime striatis, liris intermediis subtilissime granuloso corrugatis longitudinaliter incisis, albâ, fasciis pluribus aurantio brunneis transversim undatâ, intervallis fusco lineato-punctatis, intus albâ, antice rubido purpureo tinctâ*

Conch Icon , *Pectunculus*, pl 9 f 52

CARDITA RADULA *Card testa subquadrato-oblongâ, albida, depressa, costis tribus et viginti, rubido fuscis, imbricato-squamosis, squamis fornicatis, semi-erectis, subacutis, costarum interstitiis crenulatis, margine crenato*

Conch Icon , *Cardita*, pl 1 f 2

**Cardita pica.** *Card. testa elongato-ovata, gibba, alba, nigro aut fusco varie inquinata; costis septendecim sedecimve, in medio angulatis, subtiliter squamosis; intus alba, postice nigerrimo-fusca.*

Conch. Icon., *Cardita*, pl. 2. f. 8.

*Hab.* Island of Guimaras, Philippines (found under stones at low water), Cuming.

There is a peculiarity in the shape and blotching of this shell which entitles it to be distinguished as a new species. Several specimens were collected by Mr. Cuming at the above mentioned island, singularly agreeing in respect to these characters.

**Cardita gubernaculum.** *Card. testa ovato-oblonga, depressa, antice brevissima, angusta, postice latissime rotundata, subalata, brunnea, luteo purpureoque umbones versus tincta, costis plus minusve squamosis, superioribus perpaucis, majoribus, inferioribus angustis numerosis, intus brunnea, antice albicante.*

Var. β. *Testa alba, fusco vix tincta.*

Conch. Icon., *Cardita*, pl. 3. f. 9.

*Hab.* Zanzibar.

This is the nearest allied species to the *C. semi-orbiculata*, the dark variety might indeed be easily mistaken for it, were it not for the scales and peculiar elongation of the ventral portion of the shell.

**Cardita marmorea.** *Card. testa elliptico-ovata, postice rotundata, antice peculiariter brevi, lactea, nigro umbones versus maculata, costis quindecim sedecimve, recto elongatiuscule radiantibus, latescentibus, anticis crenatis, intus eburnea.*

Conch. Icon., *Cardita*, pl. 3. f. 12.

*Hab.* New Holland.

**Cardita distorta.** *Card. testa elongato-ovata, valde gibbosa, peculiariter distorta, luteola, costis duodecim aut plurimis, subsquamosis, inferioribus planiusculis.*

Conch. Icon., *Cardita*, pl. 4. f. 13.

*Hab.* Red Sea, Ruppell.

There are several specimens of this curious species in Mr. Cuming's collection, all singularly distorted in the same manner.

**Cardita Senegalensis.** *Card. testa oblonga, elongato-ovata, fulva, epidermide fusca induta, costis quindecim sedecimve, squamosis, squamis incumbentibus.*

Conch. Icon., *Cardita*, pl. 4. f. 16.

*Le jeson?* Adanson.

*Hab.* Senegal.

This shell, which I know to have been brought from Senegal by M. Rang, approaches nearer to the figure and description of *Le jéson* of Adanson than any that has been hitherto assigned to it.

**Cardita volucris.** *Card. testa elongata, postice valde gibbosa, angulata, antice brevi et coarctato-acuminata, viridescente albida, postice nigra nigroque maculata, costis septemdecim, anticis planulatis, marginem versus evanidis, posticis angulatis, hinc illinc obsolete squamosis.*

Conch Icon , *Cardita*, pl 4 f 20

Care should be taken not to confound this species with the young of the *C pectunculus* It is a solid well-developed shell, and never exceeds an inch to an inch and a half in length

CARDITA GIBBOSA *Card testâ ovato-oblongâ, solidâ, gibbosâ, albâ, costis septendecim fusco-variegatis, transversim radiantibus, rotundatis, exiliter nodulosis*

Conch Icon , *Cardita*, pl 4 f 21

This is a solid gibbous shell, the anterior side of which is not so short as in most of the oblong species of the genus

CARDITA NITIDA *Card testâ subquadrato ovali, eburneâ, maculis cæsiis variegatâ, costis duabus vel tribus et viginti, posticis præcipue crenatis, interstitiis lineis cæsiis angularibus ornatis*

Conch Icon , *Cardita*, pl 6 f 27

Var β *Testa maculis rubidis*

*Hab* Misamis isle of Mindanao, Philippines (found in sandy mud at the depth of twenty five fathoms), Cuming

This pretty shell is remarkable on account of the posterior ribs being more strongly crenated than the anterior

CARDITA OVALIS *Card testâ ovatâ, rubido-brunneâ, maculis albis sparsim variegatâ, costis octodecim aut novemdecim, crenatis, posticis lævigatis, interstitiis lineis angularibus ornatis, lunulâ distinctâ*

Conch Icon , *Cardita*, pl 6 f 28

Var β *Testa alba, maculis cæsiis variegata*

*Hab* Isle of Corrigidor, Philippines (found in coarse sand at the depth of seven fathoms), Cuming

CARDITA LACUNOSA *Card testâ subovatâ, radiatim costatâ, costis unâ vel duabus et viginti, elevatis, valde compressis, subtiliter muricato-squamosis, interstitiis latiusculis, lacunato excavatis, albâ, area posticali nigerrimo-fuscâ*

Conch Icon , *Cardita* pl 7 f 31

CARDITA CANALICULATA *Card testâ suborbiculatâ, luteolâ, fusco varie zonatâ, radiatim costatâ, costis unâ vel duabus et viginti, lateraliter compressis, annulato-serratis, interstitiis excavato-canaliculatis, intus albidâ, fusco pallide tinctâ*

Conch Icon , *Cardita*, pl 8 f 40

*Hab* Philippine Islands, Cuming

The leading features of this species are its rounded form, and the peculiar manner in which the interstices between the ribs are channeled out

CARDITA ANGISULCATA *Card testâ ovatâ, rubido-fusco tinctâ et variegatâ, radiatim costatâ, costis unâ vel duabus et viginti, planis, latiusculis, approximatis, interstitiis angustis, profunde incisis, costis umbones versus annulato-serratis, hinc illinc squamiferis, squamis erectis*

Conch Icon , *Cardita*, pl 8 f 41

This species may be easily recognized by the narrow and deeply-cut interstices between the ribs, which are unusually flat towards the margin.

CARDITA SEMEN. *Card. testâ ovatâ, subcompressâ, tenui, radiatim costatâ, costis plano-convexis, olivaceo-fuscâ.*

Conch. Icon., *Cardita*, pl. 9. f. 43.

*Hab.* Mexillones, Desert of Atacama, Bolivia (found at the depth of three fathoms). Cuming.

This minute species is the smallest of the genus; it looks like a little radiated seed.

CARDITA NODULOSA. *Card. testâ ovatâ, solidâ, radiatim costatâ, costis duabus vel tribus et viginti, compressis, regulariter nodulosis, lutescente albâ, prope marginem aurantio tinctâ.*

Conch. Icon., *Cardita*, pl. 9. f. 44.

*Hab.* Sicily?

This shell may be recognized by the compressed character of the ribs, and the very regular manner in which they are noduled.

CARDITA NAVIFORMIS. *Card. testâ trapezio-ovatâ, subcompressâ, latere postico elongato recto, radiatim costatâ; costis paululum curvatis, squamosis, fuscescente.*

Conch. Icon., *Cardita*, pl. 9. f. 45.

*Hab.* Valparaiso, South America (dredged from sandy mud at the depth of twenty-five fathoms). Cuming.

CARDITA COMPRESSA. *Card. testâ suborbiculari, solidâ, valde compressâ, epidermide olivaceâ indutâ, radiatim costatâ, costis lævibus, planiusculis, interstitiis angustis.*

Conch. Icon., *Cardita*, pl. 9. f. 46.

*Hab.* Valparaiso, South America (dredged from coarse sand at the depth of from twenty to sixty fathoms). Cuming.

Several specimens of this little species were found by Mr. Cuming at the great depth above-mentioned; it has the appearance of the *C. borealis* in miniature.

CARDITA FLABELLUM. *Card. testâ flabelliformi, radiatim costatâ, costis leviter serratis, olivaceo-fuscâ.*

Conch. Icon., *Cardita*, pl. 9. f. 47.

*Hab.* Valparaiso, South America. Cuming.

The peculiar fan shape of this minute species distinguishes it in an eminent degree from any hitherto described.

CARDITA TEGULATA. *Card. testâ subflabelliformi, radiatim costatâ, costis decem vel undecim, prominentibus, subtiliter squamulosis.*

Conch. Icon., *Cardita*, pl. 9. f. 48.

*Hab.* Valparaiso, South America (dredged from the depth of twenty-five fathoms). Cuming.

The sculpture of this shell reminds one of a tiled roof.

CARDITA CARDIOIDES. *Card. testâ globosâ, Cardiiformi, radiatim costatâ, costis rotundatis, irregulariter nodulosis, interstitiis subprofundè incisis, albidâ vel aurantiâ, strigis aurantiis latis, transversis, vivide ornatâ.*

Conch. Icon., *Cardita*, pl. 9. f. 49.

*Hab* Islands of Corrigidor and Luzon, Philippines (dredged from coarse sand at the depth of seven fathoms), Cuming

Cardita fabula *Card testá oblongo-ovatá, latere postico latiore, radiatim costatá, costis subangulatis, albá, fusco sparsim maculatá, intus albá, posticè fusco tinctá*

Conch Icon, *Cardita*, pl 9 f 50

*Hab* Island of Alboran

The locality above-mentioned is attached in manuscript to a number of specimens of this little shell in the British Museum from Mr Broderip's celebrated collection

Cypricardia serrata *Cypr testá subquadrato-ovatá, subflexuoso-distortá, incrementi gradibus laminis fragilibus numerosis, exiliter serratis, peculiariter notatis, interstitiis subtilissime radiatim sulcatis, pallide rosaceá, intus vivide purpureá*

Conch Icon, *Cypricardia*, pl 1 f 5

No figure nor description can do justice to this beautiful shell, so remarkable on account of the delicacy of the pink serrated laminæ

Cypricardia decussata *Cypr testá elongato-ovatá, regulariter convexá, tenui, albá, semipellucidá, striis exilibus, undulatis, elevatis, obliquè decussatis, ornatá*

Conch Icon, *Cypricardia*, pl 1 f 6

This is evidently one of the terebrating species, belonging to that section of the genus which De Blainville distinguishes by the new generic title of *Coralliophaga*

The term *decussated* is here used in its strictest and proper sense, signifying *oblique* crossing, as in the letter X

Cypricardia vellicata *Cypr testá oblongo-ovatá, compressá, prope marginem ventralem anticam peculiariter vellicatá, albá, latere postico purpureo fusco plus minusve vividè radiato, umbonibus purpureo-fuscis*

Conch Icon, *Cypricardia*, pl 2 f 7

*Hab* Calbayog, island of Samar, Philippines (found on soft slaty stones at low water), Cuming

Cypricardia incarnata *Cypr testá oblongo-ovatá, tenui, plano-convexá, liris planis subtilissimis numerosis ab umbonibus undulatim divergentibus, eximiè notatá, albidá, postice incarnatá*

Conch Icon, *Cypricardia*, pl 2 f 8

*Hab* Island of Burias, Philippines (found under a stone at low water), Cuming

The surpassing delicacy of the ridges is exceedingly characteristic in this species, instead of looking raised upon the surface, they have all the appearance of undulating rays of light

Cypricardia laminata *Cypr testá trapezio-oblongá, tenui, albá, latere postico valde latiore, rotundato, compresso, laminis duabus vel tribus elevatis subdistantibus fimbriato*

Conch Icon, *Cypricardia*, pl 2 f 9

*Hab* Lord Hood's Island, Pacific Ocean (found at the depth of five fathoms piercing, and partially imbedded in, the *Avicula margaritifera*), Cuming

This peculiarly shaped shell exhibits the same kind of delicate marginal frill of laminæ as the well known *Cypricardia coralliophaga*, and belongs to a mollusk of the same terebrating habits The shells of terebrating mollusks vary so exceedingly in form, according to circumstances of situation, &c, that were the *C laminata* not entirely destitute of the fine radiating striæ which characterise the *C coralliophaga*, it might be regarded as a modification of that species

CYPRICARDIA OBESA *Cypr testá subquadrato ovatá, valde gibbosá, tumidá, latere postico subobliquè angulato, longitudinaliter striatá, striis profundè incisis, lutescente albá*

Conch Icon, *Cypricardia*, pl 2 f 10

CYPRICARDIA SOLENOIDES *Cypr testá angustatá, Soleniformi, latere postico plano angulato, albá, posticè purpureo-fusco obsoletè radiatá, umbonibus purpureo-fuscis, intus albá, ad extremitatem posticam purpureo violaceo tinctá*

Conch Icon, *Cypricardia*, pl 2 f 11

*Hab* Calbayog island of Samar, Philippines (found piercing soft slaty rocks, low water), Cuming

The *Cypricardia Solenoides*, though approximating greatly in form to the *Cypricardia coralliophaga*, differs materially in structure and composition, the two species indeed exhibit all the differences upon which De Blainville founded his genus *Coralliophaga* Instead of presenting that pellucid tenuity which seems peculiar to the terebrating species, it is of the same solid opake structure as the *Cypricardia vellicata*, the umbones have the same purplish brown patch upon them, and there is an evident indication of the same posterior streaks of that colour

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## MISCELLANEOUS

### CIRSIUM SETOSUM M BIEB

This plant has recently been found by Dr Dewar of Dunfermline on the shore of the Frith of Forth near Culross, in considerable quantity It has probably been introduced from Odessa with merchandise, but is now quite established in Scotland It is very satisfactory to me to learn that Sir W Hooker, who possesses authentic specimens of M Bieberstein's plant, has come to the same conclusion which I had done concerning the identity of the plant gathered by Dr Dewar and that described in the Flora Tauro Caucasica — G C B

### ALSINE STRICTA, WAHL

A few weeks since, my friend Mr Jas Backhouse, jun of York kindly sent me a specimen of *A stricta*, which had been just discovered on Widdy Bank Fell, on the Durham side of the upper part of Teesdale, by a party of botanists, consisting of Messrs John Tatham, jun of Settle, G S Gibson of Saffron Walden, S Thompson, and Jas Backhouse, sen and jun of York Growing in so utterly wild a country, and being a native of Germany and the northern parts of Europe, it must be considered as one of the most interesting additions that has been recently made to our native flora.—C. C. B.

### TEGUMENTS OF GASTEROPOD MOLLUSCA.

Among the kinds of covering of Gasteropod Mollusca, no solid bodies have been noticed but such as are known under the name of Shells. In two genera near to *Doris*, all the fleshy part of the body is strewed in every direction with calcareous spiculæ. In one of them, these spiculæ stick out in such a manner that the animal has its body all bristled with prickles. Similar spiculæ have been met with in the mantle of a young *Bulla*. At a time when, thanks to the labours of Ehrenberg, the study of microscopic fossils has made an unexpected stride, these facts may be of some value in guarding zoologists against referring to Infusoria the remains of animals belonging to a much higher group.—*Comptes Rendus*, July 15, 1844.

### NEST OF THE DINORNIS.

*Description by Captains Cook and Flinders of Birds' Nests of enormous size on the coast of New Holland*, by Prof. EDWARD HITCHCOCK. Dec. 22, 1843.

In lecturing on the huge footmarks of sandstone in the Connecticut valley, I have been in the habit for many years of reading to my classes, *as the poetry of the subject*, some statements from the twelfth volume of the 'Athenæum, or Spirit of the English Magazines' (p. 48), respecting enormously large birds and birds' nests. As some of these statements are manifestly fabulous, it never occurred to me till today to inquire whether any of them were true. I was led to make the inquiry probably by the astonishing discoveries of Prof. Owen respecting the *danger bird* of New Zealand; and the result is, that I have almost persuaded myself that with the help of Captains Cook and Flinders *I have found the nest of the Dinornis on the coast of New Holland*. These navigators have given the following statements in their published voyages. I quote Cook's account from Kerr's 'Collection of Voyages and Travels,' vol. xiii. p. 318. It was Cook's first voyage. Lizard Island is near the north east coast of New Holland, not far from Cape Flattery, and in about 15° S. lat.

"At two in the afternoon," says Cook, "there being no hope of clear weather, we set out from Lizard Island to return to the ship, and in our way landed upon the low sandy island with trees upon it which we had remarked in our going out. Upon this island we saw an incredible number of birds, chiefly sea-fowl: we found also the nest of an eagle with young ones, which we killed; and the nest of some other bird, we knew not what, of a most enormous size. It was built with sticks upon the ground, and was no less than six and twenty feet in circumference, and two feet eight inches high. To this spot we gave the name of Eagle Island," &c.

Capt. Flinders found two similar nests on the south coast of New Holland, in King George's Bay. Not having his work at hand, I quote from the 'Quarterly Review' for October 1814 his description of these nests:—

" They were built upon the ground from which they rose above two feet, and were of vast circumference and great interior capacity, the branches of trees and other matter of which each nest was composed being enough to fill a cart

Now I suppose from the character of Captains Cook and Flinders we may place implicit confidence in the truth of these accounts Indeed Cook was accompanied to Eagle Island by Sir Joseph Banks Equally certain is it that no known bird but the Dinornis would have built so enormous a nest I am led therefore almost irresistibly to inquire whether the Dinornis may not be an inhabitant of the coast of New Holland and still alive! Even if extinct upon New Zealand it may have remained longer in the warmer climate of New Holland It may be that these nests have been accounted for in some other way, but if so, I have seen no other explanation

P S *Feb* 1844 —Having occasion to give a lecture this winter before the Young Men s Association in Troy N Y I had a drawing made of the Dinornis of the natural size on the type of the Apteryx and Cassowary and also of one of the nests described above and I assure you that the nest was only of a *respectable size* for a bird sixteen feet high —*Silliman s Journal* July 1844

## METEOROLOGICAL OBSERVATIONS FOR AUGUST 1844

*Chiswick* —August 1 Cloudy boisterous clear 2 Clear and very fine 3 Showery boisterous 4 Dusky clouds clear and fine 5 Cloudy and fine rain 6 Boisterous clear and fine 7 Clear heavy shower at noon clear and fine 8, 9 Fine 10 Slight haze fine 11 Very fine rain 12 Heavy rain 13 Showery 14 Rain heavy squalls clear and fine at night 15 Cloudy 16 Very fine 17 Densely overcast 18, 19 Very fine 20 Overcast fine 21—25 Cloudy and fine 26 Cloudy 27 Cloudy and dry 28 Clear with hot sun 29 Cloudless and hot 30 Fine 31 Hot and dry —Mean temperature of the month 2° 57 below the average

*Boston* —Aug 1 Cloudy rain early A M rain P M 2 Fine 3 Rain rain early A M rain with thunder and lightning A M rain P M 4 Cloudy 5 Fine rain at night 6 Cloudy 7 Stormy rain early A M rain with thunder and lightning A M 8 Windy rain A M 9 Windy 10 Fine 11 Fine rain P M 12 Rain 13 Fine 14 Rain rain early A M rain A M and P M 15 Cloudy rain early A M 16 Fine rain P M 17 Cloudy 18—21 Fine 22—24 Cloudy 25 Fine 26 Cloudy 27—31 Fine

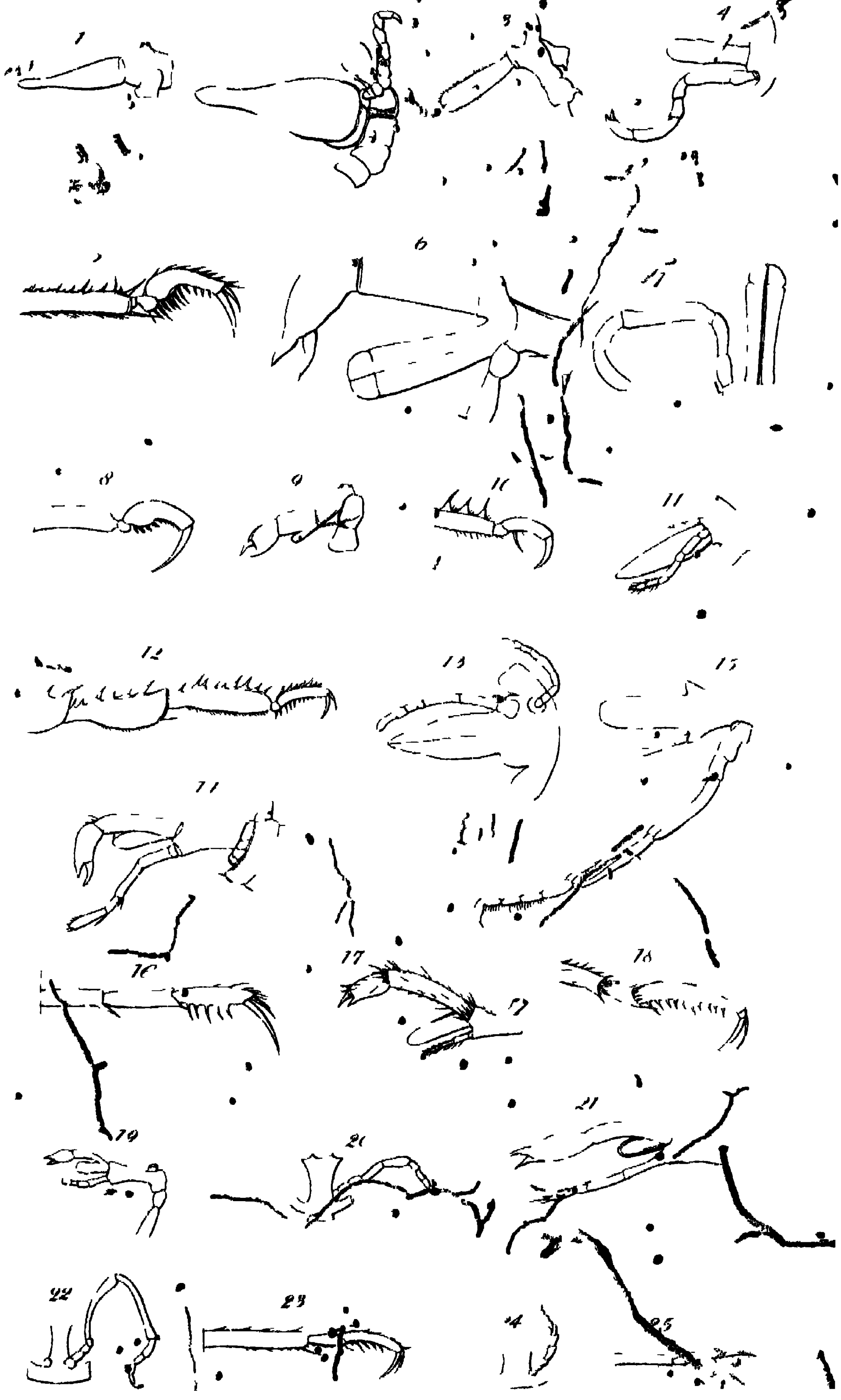
*Sandwick Manse Orkney* —Aug 1 Cloudy rain 2 Bright clear 3 Showers drizzle 4 Damp drizzle 5 Cloudy 6 Cloudy rain 7 Showers cloudy 8 Cloudy showers 9 Showers 10—13 Bright clear 14 Bright clear fine 15 Clear fine 16 Bright cloudy fine 17 Showers rain 18 Bright cloudy 19 Bright damp 20 Showers 21 Rain drizzle 22 Rain damp 23 Damp 24 Damp cloudy 25 Bright cloudy 26 Drizzle drops 27 Drizzle showers 28 Bright clear 29 Clear 30 Clear warm 31 Clear cloudy warm

*Applegarth Manse, Dumfries shire* —Aug 1—3 Showers 4 Fair 5 Fine 6 7 Heavy rain 8 Rain A M fair P M 9 A shower 10 Fair A M few drops P M 11 Fair A M rain P M 12 Fair 13 Showery 14 Showery thunder 15 Fair 16 Rain P M 17 Heavy showers 18 Fair and clear 19 Heavy showers 20 Fair 21 Fair a few drops 22 Rain 23 Heavy shower P M 24 One shower 25—31 Fair and fine

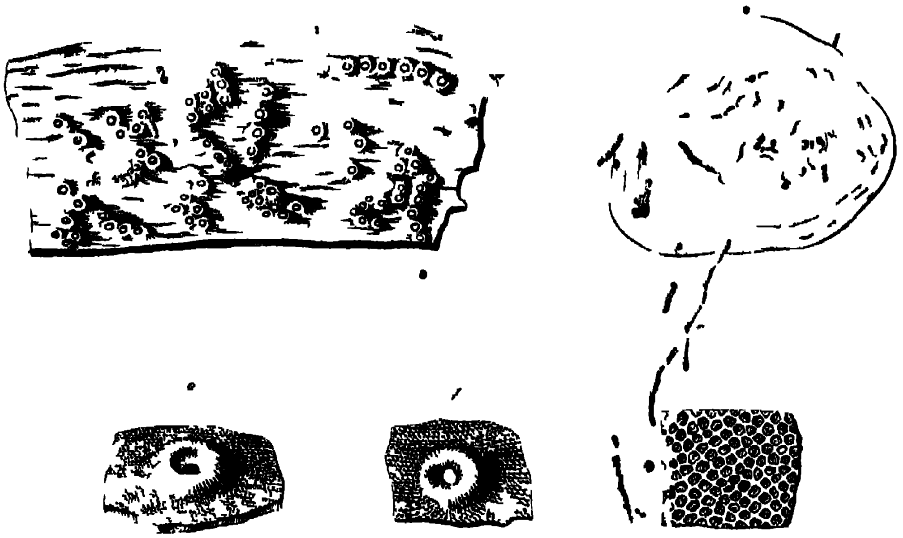
| | |
|---|---|
| Mean temperature of the month | 54° 6 |
| Mean temperature of Aug 1843 | 5[illegible] 0 |
| Mean temperature of spring water | 52 |
| Mean temperature of ditto Aug 1843 | 53 |

*Meteorological Observations made by* Mr Thompson *at the Garden of the Horticultural Society at* CHISWICK, *near London, by* Mr Veall, *at* BOSTON, *by the* Rev W Dunbar, *at Applegarth Manse,* DUMFRIES SHIRE, *and by the* Rev C Clouston, *at Sandwick Manse,* ORKNEY.

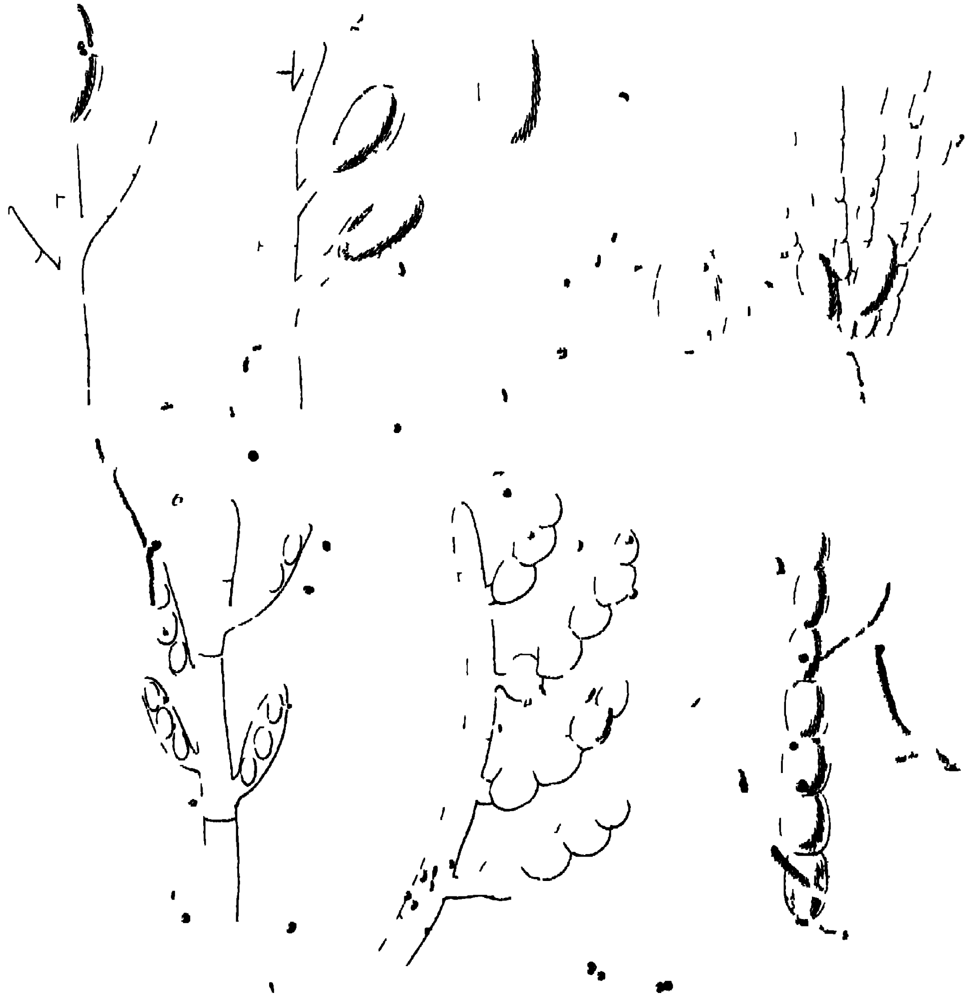
| Days of Month | Barometer | | | | | | | Thermometer | | | | | | | Wind | | | | Rain | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chiswick | | Boston 8½ a m | Dumfries-shire | | Orkney Sandwick | | Chiswick | | Boston 8½ a m | Dumfries-shire | | Orkney Sandwick | | Chiswick 1 p m | Boston | Dumfries-shire | Orkney Sandwick | Chiswick | Boston | Dumfries-shire | Orkney Sandwick |
| 1844. Aug | Max | Min | | 9 a.m | 9 p m | 9½ a.m | 8½ p.m | Max | Min | | Max | Min | 9½ a m | 8½ p m | | | | | | | | |
| 1 | 29 807 | 29 732 | 29 15 | 29 42 | 29 55 | 29 51 | 29 50 | 71 | 45 | 57 | 59½ | 51 | 57 | 53 | w | w | ss | w | 02 | 21 | | 48 |
| 2 | 29 868 | 29 774 | 29 29 | 29 67 | 29 68 | 29 65 | 29 71 | 72 | 49 | 60 | 61 | 46½ | 56 | 54 | w | w | sw | w | 11 | 04 | | 22 |
| 3 | 29 469 | 29 427 | 29 03 | 29 40 | 29 34 | 29 58 | 29 56 | 69 | 52 | 57 | 55 | 40 | 54½ | 53 | [illegible] | s | e | ne | 15 | 10 | | 04 |
| 4 | 29 833 | 29 683 | 29 05 | 29 49 | 29 61 | 29 58 | 29 71 | 77 | 44 | 58 | 62 | 50 | 56½ | 52 | w | nw | w | | 01 | 41 | | |
| 5 | 29 [illegible]33 | 29 632 | 29 19 | 29 70 | 29 63 | 29 79 | 29 79 | 72 | 57 | 64 | 65½ | 52 | 59 | 53 | s | calm | e | e | 37 | | | 07 |
| ☾ 6 | 29 587 | 29 522 | 28 81 | 29 24 | 29 00 | 29 66 | 29 44 | 71 | 52 | 66 | 65 | 53 | 57 | 54 | sw | sw | se | e | 02 | 37 | | |
| 7 | 29 656 | 29 621 | 29 00 | 29 15 | 29 25 | 29 14 | 29 10 | 71 | 50 | 62 | $56^1$ | 50½ | 55 | 54½ | sw | w | w | e | 12 | 03 | 0 75 | 45 |
| 8 | 29 71[illegible] | 29 614 | 29 02 | 29 23 | 29 38 | 29 13 | 29 33 | 72 | 47 | 61 5 | $60^1$ | 51 | 59 | 54 | w | w | w | nnw | | 02 | | 17 |
| 9 | 29 756 | 29 733 | 29 16 | 29 53 | 29 54 | 29 46 | 29 52 | 74 | 45 | 62 | 57½ | 51 | 49½ | $52^1$ | sw | w | wsw | nw | | 04 | | 14 |
| 10 | 29 744 | 29 591 | 29 14 | 29 53 | 29 59 | 29 60 | 29 66 | 76 | 41 | 61 | 65½ | 43 | 57 | 51½ | n | calm | w to n | nw | | | | 10 |
| 11 | 29 783 | 29 550 | 29 27 | 29 60 | 29 50 | 29 65 | 29 67 | 73 | 54 | 61 5 | $59^1$ | 39½ | 53½ | 49 | sw | calm | s | se | 12 | | | |
| 12 | 29 608 | 29 374 | 28 80 | 29 43 | 29 53 | 29 67 | 29 66 | 70 | 54 | 61 5 | 63½ | 52 | $55^1$ | $51^1$ | w | calm | ne | e | 35 | 40 | | |
| 13 | 29 641 | 29 531 | 29 07 | 29 45 | 29 35 | 29 56 | 29 48 | 65 | 51 | 60 | 64 | 49 | 58 | 51 | sw | calm | sw | e | 24 | | | |
| ● 14 | 29 424 | 29 331 | 28 80 | 29 18 | 29 35 | 29 43 | 29 56 | 65 | 49 | 57 | $62^1$ | 49 | 59 | 51 | w | calm | nw | | 30 | 25 | 0 30 | |
| 15 | 29 744 | 29 552 | 29 04 | 29 52 | 29 68 | 29 68 | 29 75 | 68 | 47 | 57 | 63 | 49 | 56 | 55 | nw | nw | nw | n | 03 | 49 | | |
| 16 | 29 919 | 29 836 | 29 31 | 29 75 | 29 53 | 29 77 | 29 71 | 77 | 57 | 60 | 58 | 44 | 56 | 53½ | w | w | w | | 01 | | | |
| 17 | 29 880 | 29 768 | 29 11 | 29 50 | 29 74 | 29 63 | 29 74 | 69 | 47 | 61 | 59½ | 50 | 52 | 50 | w | w | nw | nw | | 21 | | |
| 18 | 30 092 | 30 060 | 29 56 | 29 92 | 30 04 | 29 97 | 30 08 | 69 | 43 | 59 5 | 63½ | 44 | $49^1$ | 52 | nw | nw | nw | nw | | | | 30 |
| 19 | 30 119 | 30 041 | 29 52 | 30 02 | 29 82 | 29 98 | 29 78 | 72 | 60 | 58 | 60 | 47½ | 54 | 53 | w | nw | sw | se | 01 | | | |
| 20 | 29 901 | 29 768 | 29 20 | 29 72 | 29 63 | 29 60 | 29 63 | 78 | 51 | 67 | 57 | 48 | 50 | 49 | w | w | nw | nnw | | | | 09 |
| 21 | 29 747 | 29 727 | 29 10 | 29 58 | 29 58 | 29 59 | 29 60 | 65 | 52 | 58 | $57^1$ | 50 | 51 | 49 | w | calm | nw | n | | | | 42 |
| 22 | 29 727 | 29 698 | 29 12 | 29 53 | 29 52 | 29 57 | 29 55 | 67 | 42 | 57 | 58 | 50 | 51 | 52 | w | calm | w | | | | 0 95 | 30 |
| 23 | 29 726 | 29 673 | 29 16 | 29 49 | 29 57 | 29 59 | 29 67 | 69 | 38 | 58 | 64 | 49 | 55 | 51½ | sw | calm | nw | se | | | | 04 |
| 24 | 29 746 | 29 659 | 29 13 | 29 65 | 29 70 | 29 76 | 29 80 | 71 | 49 | 58 5 | 60 | 45 | 56 | 52 | sw | calm | w | w | | | | 04 |
| 25 | 29 976 | 29 90[illegible] | 29 25 | 29 79 | 29 84 | 29 81 | 29 85 | 73 | 50 | 57 | 61 | 47 | 54 | 50½ | nw | calm | nw | wn | | | | |
| 26 | 30 052 | 30 007 | 29 39 | 30 84 | 29 92 | 29 85 | 29 88 | 66 | 47 | 58 | 60 | 41 | 54 | 48½ | nw | w | nw | wn | | | | |
| 27 | 30 082 | 30 078 | 29 50 | 29 96 | 30 00 | 29 94 | 30 03 | 71 | 38 | 56 | 65 | 39 | 51 | $49^1$ | w | calm | sw | nw | | | | |
| ○ 28 | 30 137 | 30 110 | 29 59 | 30 05 | 30 06 | 30 05 | 30 08 | 78 | 40 | 53 | 68 | 43 | 51 | 53 | w | calm | sw | w | | | | |
| 29 | 30 138 | 30 113 | 29 58 | 30 06 | 30 01 | 30 08 | 30 03 | 79 | 42 | 60 | 68½ | 47 | $57^1$ | 54 | e | calm | w | | | | | |
| 30 | 30 182 | 30 127 | 29 55 | 30 04 | 30 07 | 30 03 | 30 09 | 72 | 42 | 61 | 68 | 46½ | 59 | 56 | e | calm | sw | w | | | 0 18 | |
| 31 | 30 292 | 30 278 | 29 71 | 30 20 | 30 21 | 30 22 | 30 22 | 90 | 44 | 61 5 | 70 | 48 | 57½ | 54 | se | calm | sw | se | | | | |
| Mean | 29 844 | 29 758 | 29 21 | 29 627 | 29 636 | 29 146 | 29 199 | 71 67 | 47 71 | 59 6 | 61 5 | 47 2 | 54 87 | 52 16 | | | | | 1 84 | 2 57 | 2 18 | 2 86 |



Araneiform Crustacea



Rhododermis Drummondii



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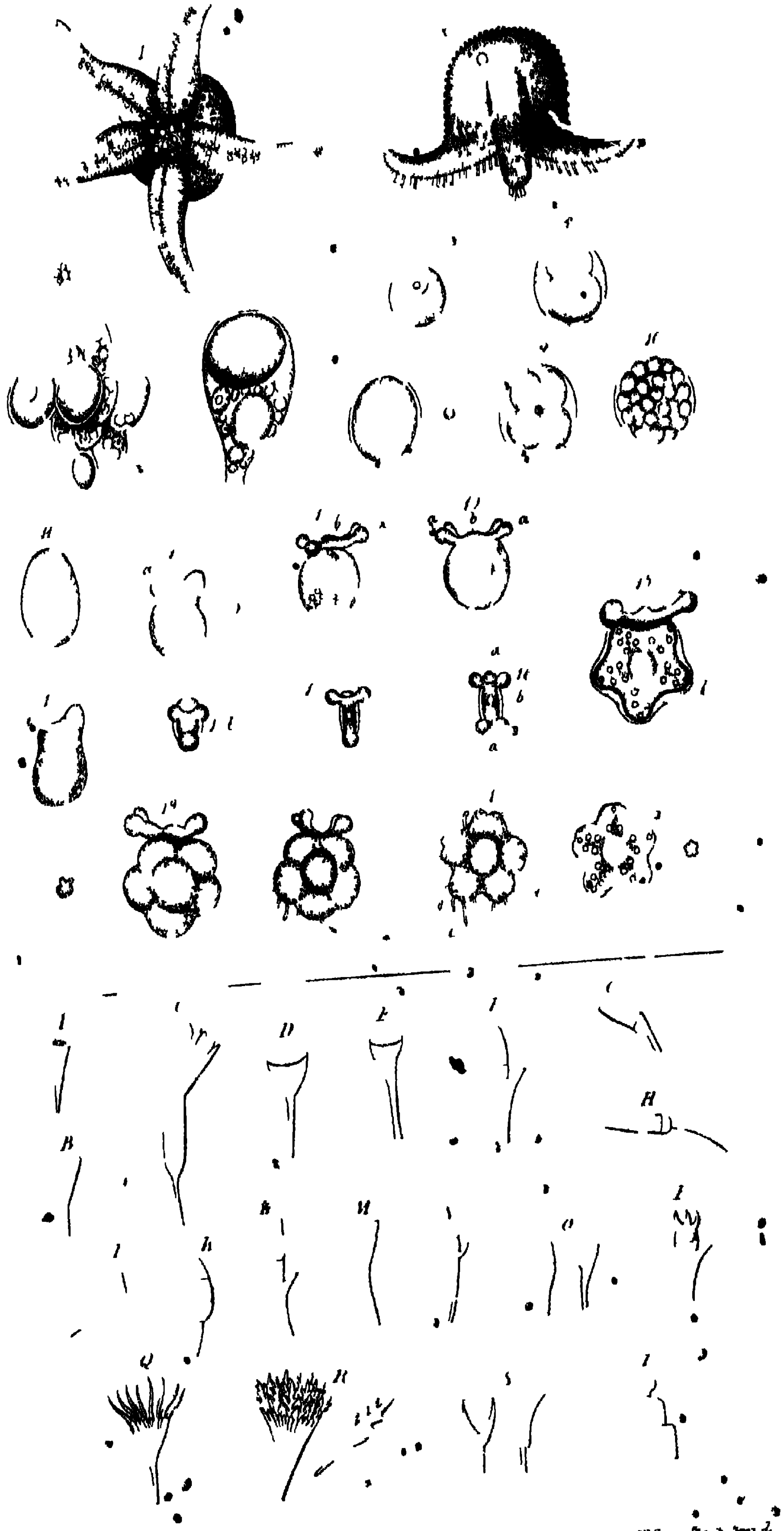
Fructification of Marine Algae



[illegible] lith [illegible] William Street Strand

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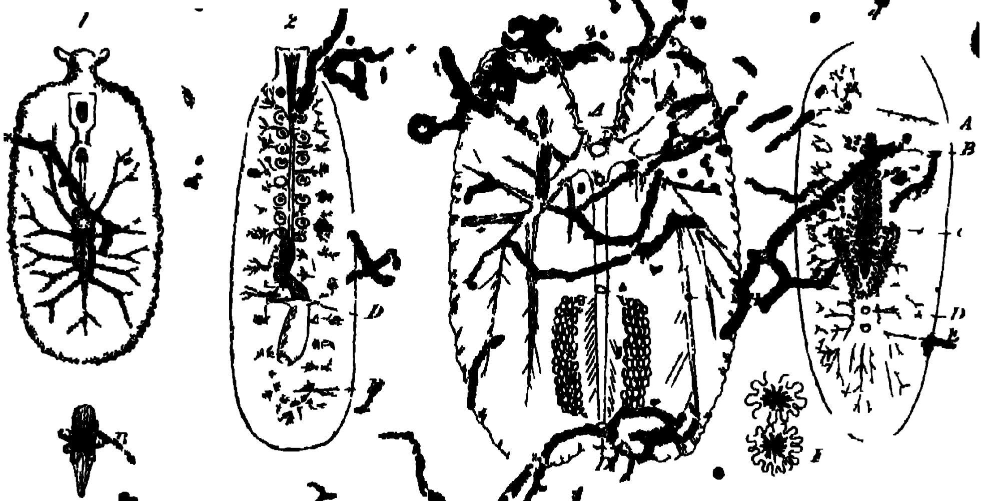
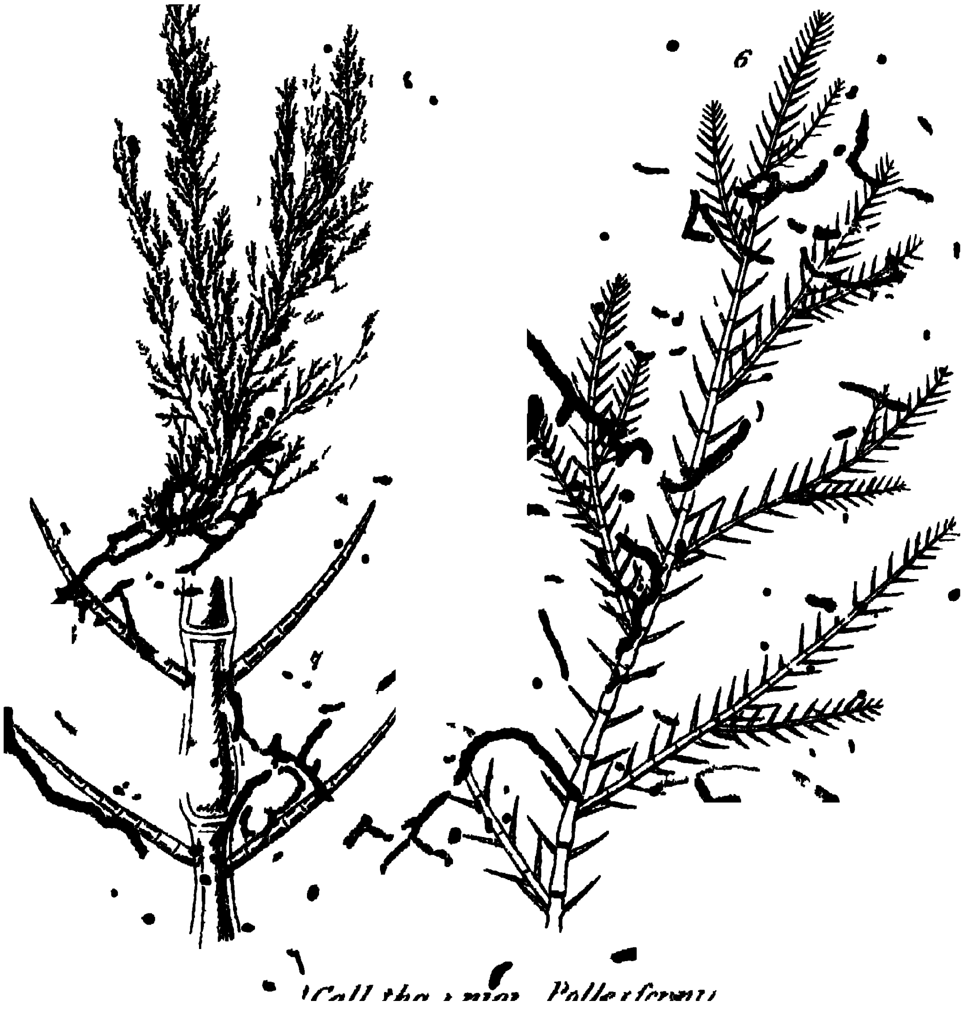
Gloiosiphonia capillaris.



1 [illegible] [illegible] macrostoma
3 Planaria [illegible]
4 Diplanaria notabilis



Callithamnion Pollexfenii